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DEPARTMENT OF COMMERCE

U. S., BUREAU OF FISHERIES

HUGH M. SMITH, Commissioner

COMMERCIAL FISHERIES OF THE UNITED STATES AND THE OPERATIONS OF THE BUREAU OF FISHERIES IN CONNECTION THEREWITH DURING FISCAL YEAR ENDED JUNE 30, 1916

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[Extracted from the Report of the Commissioner of Fisheries
to the Secretary of Commerce for the fiscal year ended June 30,
1916, pages 50-100]



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COMMERCIAL FISHERIES.

Investigations completed by the Bureau during the year, in addition to the work of local agents in collecting data for important mussel fisheries on the Atlantic and Pacific coasts, included canvasses of the fresh-water mussel fishery of the Mississippi River and its western tributaries from Kansas northward; the fisheries of Lakes Pepin and Cooper in the Mississippi River, the former between Minnesota and Wisconsin, and the latter at Keokuk, Iowa; the crab industry of Maryland and Virginia; the shad and alewife industry of Chesapeake Bay and tributaries; the coastal fisheries of New York and New Jersey, exclusive of shellfish, for 1915; and the shad fishery of the Hudson River for 1915 and 1916. The inquiries relating to the fresh-water mussel fishery in the region referred to, and those relating to the shad and alewife industry, were begun the latter part of the preceding fiscal year.

FRESH-WATER MUSSEL FISHERY.

The general canvass of the fresh-water mussel fishery, which has been in progress for several years, was completed during the past year. The streams covered were the Mississippi River and its western tributaries from Kansas northward, except the Neosho River in Kansas, which was included in the work of a previous year; and the data collected were for the calendar year 1914. A special bulletin giving the results of the canvass was issued and distributed. The number of persons engaged in the mussel fishery in these streams in 1914 was 1,873, and the investment in boats, fishing apparatus, and shore and accessory property amounted to \$132,267. The products included 8,539 tons of shells, valued at \$148,960, and pearls found in the mussels to the value of \$62,902, a total of \$211,862. All the shells were used in the manufacture of pearl buttons. The principal fishing apparatus used in taking mussels is the crowfoot bar, the catch with this appliance in this region amounting to 6,524 tons of shells, valued at \$120,859. The remainder of the catch was taken with forks, rakes, diggers, tongs, scoops, or basket rakes, and by hand while wading.

Mississippi River.—The most important of these streams is the Mississippi River, the products of which amounted to 6,626 tons of shells, valued at \$125,948, and \$50,562 worth of pearls, a total of \$176,510 in value. This shows a decline of about 58 per cent in quantity and 61 per cent in value of the output of shells and pearls since 1903, the last previous year for which data are available. In view of the fact that the mussel fishery has been prosecuted in the Mississippi River for nearly 25 years, the decline in the output is not so surprising. Nearly 94 per cent of the river's catch in 1914 was taken with crowfoot bars, and of the remainder 2 per cent were taken with forks, 2 per cent with rakes, and 2 per cent with diggers and tongs. Fishing with crowfoot bars is more vigorously prosecuted in Lake Pepin than in any other portion of the river. In many cases two rowboats or scows are connected by a bar or pole 10 to 15 feet long, a gasoline boat pushing against the middle of the bar

being used as the propelling power. The two small boats are provided with 4 crowfoot bars, 3 of which are being fished while the fourth is having the mussels removed from it. Usually two men, but occasionally only one man, handle such an outfit.

Mussel fishing on this river in 1914 was followed from Pine Bend, about 20 miles below St. Paul, Minn., to the mouth of the Missouri River, near Alton, Ill., the fishing ending abruptly at that point. A few shells have been taken as far up the river as Bemidji, Minn., but no sale of them has ever been made. Probably the most productive portion of the river in 1914 was in the vicinity of Frontenac, Minn., where, within a few miles, the 45 men engaged caught €45 tons of shells, valued at \$10,570, and \$2,100 worth of pearls and slugs. The beds near Maiden Rock, Wis., were also quite profitable, the output of 36 men amounting to 390 tons, valued at \$6,630, and \$2,100 worth of pearls. Lake Pepin as a whole produced 1,932 tons of shells, valued at \$31,486, and \$11,820 worth of pearls. It is said that there were at least 1,000 men fishing for mussels in Lake Pepin in 1911, the catch amounting to about 4,000 tons, compared with an output of less than 2,000 tons in 1914 taken by 281 fishermen.

In 1900, when the first mussel fishing was done at Red Wing, Minn., there were said to have been 75 boats at work on the beds there, compared with 8 boats in 1914. The first mussel fishing at New Albin, Iowa, was in 1899, when there were at least 20 men working on the beds, which yielded an average day's catch per man of several thousand pounds, compared with 150 to 200 pounds now. In the early days of the fishery very few shells other than niggerheads were saved. As recently as 1910 as many as 70 or 80 men worked on the mussel beds opposite New Boston, Ill., while in 1914 only 15 men were engaged and small catches were made. There were 15 or 18 mussel fishermen out of Quincy, Ill., in 1900, while in 1915 there were none, this being due both to overfishing and to the building of dams and dikes by the Government to preserve the channel of the river. Similar changes have taken place at Canton, Mo., where a button factory is located, but the shell supply is obtained from various parts of the Mississippi Valley. The mussel beds in the vicinity of Prairie du Chien a few years ago were the most prolific by-far of any in the entire river, but in 1914 the catch of 100 men in that vicinity amounted to only 385 tons, valued at \$6,872, and \$5,500 worth of pearls and slugs.

A great decline has taken place also in the beds near Muscatine, Iowa, where the industry was first established in 1891. The near exhaustion of the beds in this vicinity has caused many of the local fishermen to seek unworked mussel streams in various parts of the country.

The catch of the Mississippi River as a whole was divided among the different species approximately as follows: Niggerheads, 25 per cent; three-ridges (including blue-points), 23 per cent; wartybacks, 13 per cent; muckets, 13 per cent; pig-toes, 6 per cent; washboards, 6 per cent; pocketbooks, 3 per cent; yellow sand-shells, 2 per cent; Missouri niggerheads, 2 per cent; pistol-grips, 2 per cent; and monkey-faces, 1 per cent. The remaining 4 per cent consist of black sand-shells, ladyfingers, bullheads, and a few other unimportant species.

Cedar River.—The catch of this river was apportioned among the different forms of apparatus as follows: 54 per cent with forks, 22 per cent with hands while wading, 18 per cent with crowfoot bars, and the remainder with rakes. Muckets predominated in the catch,

with a percentage of 57. The remainder was divided as follows: Three-ridges and blue-points, 18 per cent; pocketbooks, 10 per cent; warty-backs, 3 per cent; pigtoes, 1 per cent; and a few each of pistol-grips, black sand-shells, butterflies, maple-leaves, and other unimportant species.

A few pearls and slugs were taken from this river as far up as Osage, Iowa, in 1914, but Charles City, Iowa, and vicinity was the upper limit of shell fishing. The most productive beds were in the vicinity of Cedar Rapids. This was also the lowest point on the river where shells were taken. The catch of 15 men in that locality amounted to 130 tons, valued at \$2,020, and \$975 worth of pearls and slugs.

The first mussel shells were taken for market from this river in 1905 near Vinton, where a button factory was established about that time and operated for several years.

Des Moines River.—More than 75 per cent of the river's output is taken between Ottumwa, Iowa, and about 15 miles below that city. Forty-five tons of shells were taken from the east fork of the river as far north as between Bert and Bancroft, this being the first year in which work was done on that branch of the river. The lowest point at which shells were taken was near Keosauqua, Iowa, an output of 17 tons being shown for that vicinity. The prevailing species were three-ridges (including blue-points), warty-backs, muckets, and pigtoes, with percentages of 45, 18, 15, and 13, respectively. The remainder was made up of pistol-grips, maple-leaves, monkey-faces, lady-fingers, pocketbooks, etc. About 63 per cent of the catch was made with forks, 29 per cent with hands while wading, and the remainder with rakes. The first record of any shells being taken from this river was near Keosauqua in 1910.

James River.—This river, said to be the longest unnavigable river in the United States, supported mussel fisheries from Riverside, S. Dak., to within a few miles of its mouth—Yankton, S. Dak. The most prolific beds were between Milltown and Olivet, S. Dak., and those located a few miles above and below Yankton. The total output of the river in 1914 amounted to 260 tons, valued at \$3,498, and \$700 worth of pearls and slugs. Twenty-seven persons were engaged in the fishery and had an investment of \$1,460, including apparatus, boats, and shore property. About 90 per cent of the catch was taken with scoops, or basket rakes, and the remainder with forks and by hand. The output was composed of 85 per cent three-ridges (including blue-points), 10 per cent fat muckets, and the remainder maple-leaves, pocketbooks, and heel-splitters. The first record of any mussel fishing being done in the James River was in 1912. Pearls, however, were taken several years previously.

Osage and Marais des Cygnes Rivers.—The Osage and Marais des Cygnes Rivers are treated as one, the latter being the name given to that portion of the river flowing through Kansas. Forty men, with an investment of \$1,261, were engaged in shelling on this river from near Trading Post, Kans., as far down as Warsaw, Mo. The total output in 1914 amounted to 204 tons of shells, with a value of \$2,111, and \$380 worth of pearls. About 37 per cent of the catch was made with forks, 26 per cent with hands while wading, 22 per cent with crowfoot bars, and the remainder with diggers and tongs. The output was apportioned among the different species as follows: Three-

ridges (including blue-points), 43 per cent; washboards, 17 per cent; pig-toes, 15 per cent; muckets, 12 per cent; and a few each of warty-backs, monkey-faces, lady-fingers, pistol-grips, maple-leaves, and butterflies. The most prolific beds were those between Warsaw and 55 miles above that town, 22 men working on these beds obtaining 110 tons, with a value of \$1,540, and \$100 worth of pearls.

Wapsipinicon River.—Mussel fishing on this river in 1914 extended from Independence as far down as Anamosa, Iowa. The total output was 132 tons, valued at \$1,797, together with \$765 worth of pearls and slugs. The 37 persons engaged had an investment, in apparatus, boats, and shore property, of \$811. More than 50 per cent of the catch was made with forks, the remainder being taken by hand while wading, and with crowfoot bars, and rakes. The catch was divided among the different species as follows: 71 per cent muckets, 15 per cent blue-points and three-ridges, 10 per cent pocketbooks, and the remainder warty-backs, squaw-foots, pig-toes, and heel-splitters. The first mussel fishing on this river of which there is any record was in 1908.

Iowa River.—The total output of this river in 1914 was 93 tons of shells, valued at \$1,038, and \$2,975 worth of pearls and slugs. The 86 persons engaged had an investment of \$345 in apparatus, \$500 in boats, and \$300 in shore property. More than one-half of the shells were taken with hands while wading, about 25 per cent with forks, and the remainder with crowfoot bars and rakes. The shells were apportioned among the various species as follows: 42 per cent muckets, 30 per cent pocketbooks, 20 per cent three-ridges (including blue-points), and the remainder divided among warty-backs, squaw-foots, pistol-grips, black sand-shells, maple-leaves, pig-toes, lady-fingers, heel-splitters, and butterflies. Pearls were found as far up the river as Popejoy, but the upper limit of mussel fishing was near Eldora, from which place it was followed at intervals as far down the river as North Liberty. The first mussels for commercial use were taken from this river in 1908.

Minnesota River.—Mussels were taken at intervals along this river in 1914 from Montevideo, Minn., to within a short distance of its mouth, the total output amounting to 118 tons of shells, valued at \$1,254, and \$455 worth of pearls. The 13 men engaged had \$120 invested in apparatus, \$280 in boats, and \$145 in shore property. The most important catch was made in the vicinity of New Ulm, Minn. The entire output of the river was taken with crowfoot bars, and was composed of 56 per cent three-ridges (including blue-points), 27 per cent muckets, 6 per cent washboards, 5 per cent warty-backs, and a few each of niggerheads, pig-toes, and pistol-grips. The first commercial fishing in the Minnesota River was done near its mouth in 1905 by a few fishermen from the Mississippi River, who remained only a short time. Work was followed up more steadily from 1909.

Meramec River.—Mussel shells were taken from the Meramec River in 1914 at various localities between St. Clair and Valley Park, Mo., the total output amounting to 90 tons, valued at \$830, and \$465 worth of pearls and slugs. The 30 fishermen engaged had an investment of \$280 in apparatus, boats, and shore property. Nearly nine-tenths of the mussels were taken by hand and the remainder with crowfoot bars. Muckets composed about 43 per cent, three-ridges

26 per cent, washboards 8 per cent, and warty-backs and pistol-grips, or buckhorns, 7 per cent each of the catch, the balance being made up of pig-toes, niggerheads, maple-leaves, and monkey-faces. The first commercial fishing on this river was in 1910.

Blue River.—Some mussel fishing was done on this river near Beatrice, Nebr., in 1914, a total catch of 55 tons of shells, valued at \$770, being reported.

South Skunk River.—The 5 fishermen on this river caught 43 tons of mussel shells, valued at \$602, and \$310 worth of pearls and slugs from the South Skunk River near Oskaloosa, Iowa, in 1914. Some shells were taken from the Skunk River proper in 1913, but none in 1914.

Shell Rock River.—Mussels were taken from this river between Marble Rock and Shell Rock, Iowa, the total output, however, being only 32 tons, valued at \$354, and \$210 worth of pearls and slugs. Only 6 men were engaged on the entire stream in 1914. One-half of the catch was made with forks, and the remainder with hands, crow-foot bars, and rakes. The different species were found in the following proportions: Pocketbooks, 47 per cent; muckets, 43 per cent; blue-points, or three-ridges, 8 per cent; and a few squaw-foots. No shelling was done on the river previous to 1908.

Cottonwood and Bourbeuse Rivers.—The two remaining streams in the region canvassed were the Cottonwood and Bourbeuse Rivers. Shells were taken on the former river at Cottonwood Falls, Kans., and on the latter near St. Clair, Mo., the combined catch of the two rivers amounting to 65 tons, valued at \$430, and \$60 worth of pearls and slugs.

Statistics of the mussel fishery.—Complete statistics for all of the mussel-bearing streams of the Mississippi Valley show a total of 10,331 persons engaged in the fishery, an investment of \$540,608, and a catch of 51,571 tons of shells, valued at \$825,776, together with \$376,284 worth of pearls and slugs; the total value of the products amounting to \$1,202,060. Statistics of the mussel fishery of the Mississippi River and its western tributaries from Kansas northward for 1914, and of the entire Mississippi Valley in three sections for 1912, 1913, and 1914, respectively, are given in the following tables:

FRESH-WATER MUSSEL FISHERY OF THE MISSISSIPPI RIVER AND ITS WESTERN TRIBUTARIES FROM KANSAS NORTHWARD IN 1914.^a

Items.	Blue River, Nebr., and Cottonwood River, Kans.		Cedar River, Iowa.		Des Moines River, Iowa.		Iowa River, Iowa.		James River, S. Dak.		Meramec and Bour- beuse Rivers, Mo.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Persons engaged:												
Fishermen.....	7		80		31		86		27		32	
Shoresmen.....			10									
Total.....	7		90		31		86		27		32	
Fishermen, classified by meth- ods used:												
Crowfoot bars.....			25				20				4	
Forks.....			77		31		85		2			
Rakes.....			6		3		40					
Diggers or dredgers.....												
Tongs.....												
Scoops, or basket rakes.....									25			
Waders.....	7		60		30		86		2		32	
Total, exclusive of dupli- cation.....	7		80		31		86		27		32	
Boats:												
Rowboats.....	7	\$55	74	\$660	31	\$295	82	\$500	13	\$245	28	\$130
Gasoline boats.....			3	265					9	995		
House-boats.....												
Total.....	7	55	77	925	31	295	82	500	22	1,240	28	130
Apparatus:												
Crowfoot bars..... pairs.....			25	365			20	200			2	20
Forks.....			77	103	31	44	85	115	2	3		
Rakes.....			6	6	3	2	40	30				
Diggers or dredgers.....												
Tongs.....												
Scoops, or basket rakes.....									15	67		
Total.....				474		46		345		70		20
Shore and accessory property.....		10		565		375		300		220		150
Total investment.....		65		1,964		716		1,145		1,530		300
Products:												
Shells—												
With crowfoot bars..... tons.....			87	994			10	110			10	90
With forks..... do.....			261	3,316	211	2,777	23	256	20	240		
With rakes..... do.....			20	285	25	325	10	110				
With diggers or dredgers, tons.....												
With tongs..... tons.....												
With scoops, or basket rakes..... tons.....												
With hands..... do.....	110	1,120	117	1,331	100	1,300	50	562	232	3,162	90	820
Total.....	110	1,120	485	5,926	336	4,402	93	1,038	260	3,498	100	910
Pearls.....		100		3,665		2,305		2,975		700		475
Total value of products.....		1,220		9,591		6,707		4,013		4,198		1,385

^a Not including the Neosho River, shown in another table.

FRESH-WATER MUSSEL FISHERY OF THE MISSISSIPPI RIVER AND ITS WESTERN TRIBUTARIES FROM KANSAS NORTHWARD IN 1914^a—Continued.

Items.	Minnesota River, Minn.		Mississippi River.		Osage and Marais des Cygnes Rivers, Mo. and Kans.		Shell Rock and South Skunk Rivers, Iowa.		Wapsipicon River, Iowa.		Total.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Persons engaged:												
Fishermen.....	13		1,383		39		11		35		1,744	
Shoresmen.....			115		1		1		2		129	
Total.....	13		1,498		40		12		37		1,873	
Fishermen, classified by methods used:												
Crowfoot bars.....	13		1,364		8		3		15		1,452	
Forks.....			48		25		10		35		313	
Rakes.....			33				5		2		89	
Diggers or dredgers.....			9		2						11	
Tongs.....			14		10						24	
Scoops, or basket rakes.....											25	
Waders.....					17		5		29		268	
Total, exclusive of duplication.....	13		1,383		39		11		35		1,744	
Boats:												
Rowboats.....	9	\$95	734	\$12,360	32	\$205	10	\$80	35	\$235	1,055	\$14,860
Gasoline boats.....	3	185	731	72,755	2	650			1	100	749	74,950
House-boats.....			55	6,595							55	6,595
Total.....	12	280	1,520	91,710	34	855	10	80	36	335	1,859	96,405
Apparatus:												
Crowfoot bars.....pairs..	10	120	1,405	16,816	8	80	3	39	15	200	1,488	17,840
Forks.....			48	103	25	31	10	13	35	44	313	456
Rakes.....			23	51			5	4	2		79	95
Diggers or dredgers.....			32	164	2	10					34	174
Tongs.....			14	70							14	70
Scoops, or basket rakes.....											15	67
Total.....		120		17,204		121		56		246		18,702
Shore and accessory property.....		145		14,795		285		85		230		17,160
Total investment.....		545		123,709		1,261		221		811		132,267
Products:												
Shells—												
With crowfoot bars, tons.....	118	1,254	6,216	117,238	45	630	13	168	25	375	6,524	120,859
With forks.....tons..			149	3,308	75	730	41	526	72	985	852	12,138
With rakes.....do..			132	3,049			11	150	8	100	206	4,019
With diggers or dredgers.....tons..			85	1,393	20	280					105	1,673
With tongs.....do..			44	960	10	140					54	1,100
With scoops, or basket rakes.....tons..											232	3,162
With hands.....do..					54	331	10	112	27	337	566	6,009
Total.....	118	1,254	6,626	125,948	204	2,111	75	956	132	1,797	8,539	148,960
Pearls.....		455		50,562		380		520		765		62,902
Total value of products.....		1,709		176,510		2,491		1,476		2,562		211,862

^a Not including the Neosho River, shown in another table.

FRESH-WATER MUSSEL FISHERY OF THE MISSISSIPPI VALLEY.

Items.	Streams tributary to Gulf of Mexico from Ohio River southward in 1912. ^a		Streams tributary to Great Lakes and Ohio and Mississippi Rivers north of the Ohio and east of the Mississippi River in 1913. ^b		Mississippi River and its western tributaries from Kansas northward in 1914. ^c		Total. ^d	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Persons engaged:								
Fishermen.....	4,665		3,337		1,744		9,746	
Transporters.....	91						91	
Shoresmen.....	110		255		129		494	
Total.....	4,866		3,592		1,873		10,331	
Fishermen, classified by methods used:								
Crowfoot bars.....	2,793		2,216		1,452		6,461	
Forks.....	364		1,116		313		1,793	
Tongs.....	1,232		513		24		1,769	
Diggers.....			140		11		151	
Dredgers.....	43		63				106	
Rakes.....	21		93		89		203	
Scoops, or basket rakes.....					25		25	
Miscellaneous apparatus.....			13				13	
Waders.....	1,051		944		268		2,263	
Total, exclusive of duplication.....	4,665		3,337		1,744		9,746	
Boats and vessels:								
Rowboats and barges.....	4,276	\$26,631	2,199	\$16,712	1,055	\$14,860	7,530	\$58,203
Gasoline boats.....	446	59,545	1,031	87,320	749	74,950	2,226	221,815
House-boats.....	579	46,990	115	14,610	55	6,595	749	68,195
Vessels transporting.....	25	56,265					25	56,265
Total.....	5,326	189,431	3,345	118,642	1,859	96,405	10,530	404,478
Apparatus:								
Crowfoot bars.....pairs..	2,795	31,896	2,212	24,395	1,488	17,840	6,495	74,131
Forks.....	364	7,427	1,103	1,441	313	456	1,780	2,324
Tongs.....	1,245	7,321	513	2,796	14	70	1,772	10,187
Diggers.....			102	658	34	174	136	832
Dredges.....	19	1,500	36	63			55	1,563
Rakes.....	21	58	85	119	79	95	185	272
Scoops, or basket rakes.....					15	67	15	67
Miscellaneous apparatus.....				9				9
Total.....		41,202		29,481		18,702		89,385
Shore and accessory property.....		10,853		18,732		17,160		46,745
Total investment.....		241,486		166,855		132,267		540,608
Products:								
Shells—								
With crowfoot bars.....tons..	14,531	210,521	15,258	245,477	6,524	120,859	36,313	576,857
With forks.....do.....	1,277	15,283	3,282	55,757	852	12,138	5,421	83,178
With tongs.....do.....	3,201	55,568	790	13,559	54	1,100	4,045	70,227
With diggers.....do.....			1,733	28,200	105	1,673	1,838	29,873
With dredges.....do.....	303	5,091	225	4,500			528	9,591
With rakes.....do.....	24	379	161	2,856	206	4,019	391	7,254
With scoops, or basket rakes.....tons.....					232	3,162	232	3,162
With miscellaneous apparatus.....tons.....			34	453			34	453
With hands.....do.....	379	7,764	1,824	31,408	566	6,009	2,769	45,181
Total.....	19,715	294,606	23,317	382,210	8,539	148,960	51,571	825,776
Pearls.....		149,121		164,261		62,902		376,284
Total value of products.....		443,727		546,471		211,862		1,202,060

^a From Statistical Bulletin 305. This includes Neosho River, Kans.^b From Statistical Bulletin 314. This does not include tributaries of the Ohio River in Ohio, data for which were shown in Statistical Bulletin 305.^c From Statistical Bulletin 343. This does not include the Neosho River, Kans., data for which were shown in Statistical Bulletin 305.^d Obtained by combining statistics for the three sections of the Mississippi Valley for 1912, 1913, and 1914, respectively.^e Includes 56 women.^f Includes 253 women.^g Includes 118 women.

FISHERIES OF LAKE PEPIN AND LAKE COOPER.

Lake Pepin.—Lake Pepin, an expansion of the Mississippi River between Minnesota and Wisconsin, is nearly 25 miles long and 3 miles wide at its greatest breadth. It supports quite extensive fisheries. Pepin, Wis., is the most important town in the extent of its fisheries along the lake. Maiden Rock, Wis., also supports important fisheries.

In 1914 there were 137 fishermen engaged in the industry, their total investment amounting to \$43,599. The investment included 28 gasoline boats, worth \$7,625; 53 rowboats, valued at \$1,300; 1 houseboat, valued at \$100; 295 fyke nets, valued at \$24,995; 14 seines, valued at \$3,340; 664 anchored gill nets, valued at \$4,421; 8 trap nets, with a value of \$480; \$3 worth of lines, and \$1,335 worth of shore and accessory property. The total output of the lake amounted to 758,670 pounds of fish, with a value to the fishermen of \$33,719. Buffalofish, German carp, fresh-water drum, and catfish made up 94 per cent of the value of the entire catch. The most important apparatus used was the fyke net, known locally as hoop net. The catch therewith amounted to 337,446 pounds of fish, valued at \$18,973. The leading species included in the catch were buffalofish, fresh-water drum, German carp, suckers, and quillbacks, or white carp. Seines ranked next in importance with a catch of 291,216 pounds of fish, having a value of \$8,219. German carp and buffalofish were the two leading species taken, the value of the two being more than three-fourths that of the entire seine catch. The catch by anchored gill nets amounted to 126,198 pounds, valued at \$6,432. As in the case of seines, the principal species taken were the buffalofish and German carp. Trap nets and lines were also used, but the combined catch of the two amounted to only 3,810 pounds, with a value of \$95.

The fishery conditions on Lake Pepin have improved very much within the past 15 years by the opening up of the New York market during the winter season. Previously there was only a local demand for the fish. A considerable portion of the winter fishing is done through the ice. Comparatively few fish are handled during warm weather, as the demand is then very light. There is a close season along the lake in both Minnesota and Wisconsin from April 15 to June 15.

Lake Cooper.—Lake Cooper, which is merely a widening of the Mississippi River formed by back water from the dam at Keokuk, Iowa, has a length of about 50 miles.

There was a total of 105 men engaged in the fisheries of this lake during 1914. These men had an investment of \$16,190, and caught 661,135 pounds of fish, valued at \$23,300. Buffalofish, German carp, and catfish contributed 94 per cent of the value of the total catch. The most important form of apparatus used was the fyke net, known locally as bait net. The catch by this form of net amounted to 488,005 pounds, valued at \$16,210. The remainder of the catch was taken with lines and trammel nets. The most important species taken both in fyke nets and trammel nets were German carp and buffalofish. Catfish and German carp constituted the principal species taken on lines.

The form of fyke net in general use on Lake Cooper is much smaller than those used on Lake Pepin, having neither leader, wings, nor

heart, as have most of those on the latter lake. The Lake Cooper fyke nets have from 4 to 7 hoops, 2½ feet in diameter. There was one set in the lake opposite Sandusky, Iowa, in 1914, however, which had 9 hoops, the largest being 11 and the smallest 7 feet in diameter. The total length of this net was 57 feet.

FISHERIES OF LAKE PEPIN AND LAKE COOPER (MISSISSIPPI RIVER) IN 1914.

Items.	Lake Pepin.		Lake Cooper.	
	Number.	Value.	Number.	Value.
Persons engaged:				
Fishermen.....	135		105	
Shoresmen.....	2			
Total.....	137		105	
Boats, apparatus, and other property:				
Gasoline boats.....	28	\$7,625	36	\$3,870
Rowboats.....	53	1,300	84	1,250
House-boats.....	1	100	10	1,075
Fyke nets.....	295	24,995	1,378	5,693
Seines.....	14	3,340		
Anchored gill nets.....	664	4,421		
Trammel nets.....			14	304
Trap nets.....	8	480		
Trot and hand lines.....		2		153
Shore and accessory property.....		1,535		3,845
Total.....		43,599		16,190
Products by apparatus:				
With seines—				
Buffalofish.....pounds..	43,550	2,354		
Catfish.....do.....	11,785	738		
Fresh-water drum.....do.....	42,150	400		
German carp.....do.....	137,920	3,967		
Mooneye, fresh.....do.....	3,000	25		
Mooneye, smoked.....do.....	365	16		
Quillback, or white carp.....do.....	45,775	459		
Spoonbill cat, or paddlefish.....do.....	2,205	138		
Sturgeon, lake.....do.....	616	73		
Suckers.....do.....	3,850	49		
Total.....	291,216	8,219		
With fyke nets—				
Buffalofish.....pounds..	173,450	14,068	232,585	8,615
Catfish.....do.....	10,975	743	18,415	1,258
Crappie.....do.....			50	3
Dogfish.....do.....	1,534	16		
Fresh-water drum.....do.....	85,000	1,964	21,455	642
German carp.....do.....	30,547	1,228	209,715	5,456
Mooneye, fresh.....do.....	6,300	63		
Mooneye, smoked.....do.....	1,100	54		
Quillback, or white carp.....do.....	13,305	378		
Spoonbill cat, or paddlefish.....do.....	340	19		
Sturgeon, lake.....do.....	405	50	1,095	69
Suckers.....do.....	14,490	390	4,640	164
Sunfish.....do.....			50	3
Total.....	337,446	18,973	488,005	16,210
With anchored gill nets—				
Buffalofish.....pounds..	44,250	3,306		
Catfish.....do.....	3,760	244		
Fresh-water drum.....do.....	1,235	21		
German carp.....do.....	69,050	2,428		
Quillback, or white carp.....do.....	1,525	27		
Spoonbill cat, or paddlefish.....do.....	6,332	400		
Sturgeon, lake.....do.....	46	6		
Total.....	126,198	6,432		
With trammel nets—				
Black bass.....pounds..			15	1
Buffalofish.....do.....			15,230	543
Catfish.....do.....			1,055	69
Crappie.....do.....			20	1
Fresh-water drum.....do.....			3,065	108
German carp.....do.....			61,885	1,408
Sturgeon, lake.....do.....			675	40
Total.....			81,915	2,170

FISHERIES OF LAKE PEPIN AND LAKE COOPER (MISSISSIPPI RIVER) IN 1914—Con.

Items.	Lake Pepin.		Lake Cooper.	
	Number.	Value.	Number.	Value.
Products by apparatus—Continued.				
With trap nets—				
Catfish..... pounds..	235	\$15		
Fresh-water drum..... do..	3,400	65		
Total.....	3,635	80		
With trot and hand lines—				
Buffalofish..... pounds..			2,085	\$94
Catfish..... do..	75	5	52,065	3,528
Eels..... do..			3,800	250
Fresh-water drum..... do..			2,340	77
German carp..... do..			30,765	959
Pike..... do..	50	5		
Sturgeon, lake..... do..			130	12
Sunfish..... do..	50	5		
Total.....	175	15	91,185	4,920
Grand total.....	758,670	33,719	661,135	23,300
Product by species:				
Black bass..... pounds..			15	1
Buffalofish..... do..	261,250	19,728	249,900	9,252
Catfish..... do..	26,830	1,745	71,535	4,855
Crappie..... do..			70	4
Dogfish..... do..	1,534	16		
Eels..... do..			3,800	250
Fresh-water drum..... do..	131,785	2,450	26,860	827
German carp..... do..	237,517	7,623	302,365	7,823
Mooneye, fresh..... do..	9,300	88		
Mooneye, smoked..... do..	1,465	70		
Pike..... do..	50	5		
Quillback, or white carp..... do..	60,605	864		
Spoonbilib cat, or paddlefish..... do..	8,877	557		
Sturgeon, lake..... do..	1,067	129	1,503	121
Suckers..... do..	18,340	434	4,640	164
Sunfish..... do..	50	5	50	3
Total.....	758,670	33,719	661,135	23,300

CRAB INDUSTRY OF MARYLAND AND VIRGINIA.

The blue crab is one of the most valuable fishery resources of Chesapeake Bay. In no other body of water is this species so abundant and important. The increasing magnitude of the fishery has occasioned much concern among those solicitous for its future welfare, and there has been much discussion of the necessity for restrictive measures in Maryland and Virginia. The Bureau desired to give the States full and reliable data on which to base any needed action; and accordingly it placed its agents in the field on November 15, 1915, and on December 21, 1915, was able to issue a printed bulletin containing detailed statistics of the industry for the calendar year 1915. This bulletin, which was very favorably received because of its timely appearance and valuable contents, was distributed to State legislators and fishery officials, to crab fishermen, dealers, and cannerymen, and to all other interested persons.

In Maryland the growth of the hard-crab industry has been quite marked during the past few years, owing to the increasing number of firms engaged in shipping crab meat. The soft-crab fishery has scarcely more than held its own. The crab industry of this State in 1915 gave employment to 7,312 persons, of whom 4,053 were engaged in the shore or boat fisheries, 41 on fishing and transporting vessels, and 3,218 in the wholesale trade and canning industry. The invest-

ment in vessels, boats, fishing apparatus, and shore and accessory property was \$485,627. The wages paid in the wholesale and canning trades amounted to \$191,840. The catch aggregated 90,281,646 crabs in number, or 30,093,882 pounds, valued at \$664,651. This includes 22,491,675 pounds of hard crabs, valued at \$335,375, and 7,602,207 pounds of soft crabs, valued at \$329,276. The hard crabs were taken chiefly with trot lines, and smaller quantities with scrapes and scoop nets. The greater part of the catch of soft crabs was taken with scrapes and scoop nets, and the remainder with trot lines and seines.

Crisfield still remains the center of both soft and hard crab industries, about three-fourths of the entire crab catch of the State being handled and shipped from that place in a live condition or as crab meat. Many soft crabs are also brought here for shipment in the early spring from the western shore of Virginia. In 1915 there were 47 firms in Crisfield and immediate vicinity handling soft crabs only, 17 firms handling hard crabs only, 2 firms handling both soft and hard crabs, and 1 firm which canned soft crabs. Several of the soft-crab firms had branch houses at various localities throughout Somerset and Dorchester Counties, Md., and Accomac County, Va., their products being brought to Crisfield for shipment. Most of the crabs caught on the western shore of Maryland are also brought by gasoline boats to Crisfield for shipment. With the exception of a few shipped by steamer for consumption in Baltimore, practically all of the soft crabs are sent by express from Crisfield.

Somerset County leads all other counties in the production of crabs, the value of its output to the fishermen in 1915 amounting to \$365,498, as compared with \$130,136 for Dorchester, \$106,480 for Talbot, \$18,695 for Queen Anne, \$14,210 for Anne Arundel, \$12,385 for Kent, \$4,900 for Calvert, \$3,425 for St. Mary, \$1,850 for Wicomico, \$1,670 for Charles, and \$1,000 for Baltimore. The value of the hard-crab industry far exceeds that of the soft-crab industry in all of the above counties except Somerset, where the conditions are reversed. All of the soft crabs except a few used for canning at Crisfield are shipped alive, while most of the hard crabs are utilized in the extraction of the meat, which is packed and shipped in tin buckets. There were only 3 firms in the State canning crabs in 1915, 2 of these handling hard and 1 soft crabs; the combined output of these firms was 179,976 cans, including a few glass jars, having a value of \$33,759.

The crab industry of Virginia employed 2,978 persons and \$367,150 in invested capital. The catch amounted to 60,748,158 crabs in number, or 20,249,386 pounds, valued at \$317,156; of these, 18,765,148 pounds, valued at \$242,754, were hard crabs, and the remainder, 1,484,238 pounds, valued at \$74,402, were soft crabs. The most important apparatus used for crabs in Virginia is the trot line, which took 14,042,861 pounds, valued at \$135,817; dredges are next, with a catch of 4,196,000 pounds, valued at \$94,928; the remaining hard crabs were taken by means of scrapes and scoop nets. Scoop nets constitute the most important apparatus used in the soft-crab fishery, the catch with these amounted to 867,797 pounds, valued at \$47,362; scrapes are next in importance with 616,441 pounds, valued at \$27,040.

Considering the relative importance of this industry by counties, Elizabeth City County ranks first with 5,040,840 pounds, valued at \$78,533; Accomac County is next with 4,352,612 pounds, valued at \$96,130. The former county has an excess of 688,228 pounds over the latter, but the value is \$17,597 less. This is explained by the fact that Accomac County has quite an important soft-crab fishery, while Elizabeth City County has only hard crabs. The third in importance is York County, with 2,204,800 pounds, valued at \$27,504; the fourth is Mathews County, with 1,997,760 pounds, valued at \$18,221; the fifth is Norfolk County, with 1,959,000 pounds, valued at \$21,772; the sixth is Northampton County, with 1,050,264 pounds, valued at \$24,587. The remaining counties have less than 1,000,000 pounds each. Accomac County leads in the production of soft crabs, the catch this year being 1,150,996 pounds, valued at \$50,645. Northumberland County leads the western-shore counties in the production of soft crabs, the catch amounting to 166,390 pounds, valued at \$12,564; Lancaster County, the next in point of importance, shows a catch amounting to 78,720 pounds, valued at \$5,928. Great Wicomico River region in the former county and Corrotoman River, a branch of Rappahannock River, in the latter county are regarded as quite productive and remunerative soft-crab waters, rendered more remunerative, probably, because of the fact that the soft crabs appear here earlier than on the eastern shore, in the Tangier Sound region, and the Crisfield dealers send boats over in the early spring for the catch.

Crab fishing usually starts in Northumberland and Lancaster Counties about the 15th or 20th of April, while the soft-crab season about Crisfield does not begin until about the middle of May. The catch, as well as the demand, diminishes about the early part of June, and many of the fishermen then seek other employment, although the Crisfield boats continue the trips practically throughout the season. These boats also call at other points on the western shore to make crab collections. Trot-line fishing is carried on with more or less importance in every county along both the eastern and western shores, but at many points on the latter side the fishermen lack good shipping facilities, the only outlet being to Baltimore by steamer, and crabs thus shipped from some places one morning do not reach their destination until the following morning. Many of the York County fishermen go to the lower part of the bay, where they consider the fishing grounds to be more productive, and sell their catch to Hampton. Some little trot-line fishing is carried on by Princess Anne County fishermen living about Lynnhaven Inlet. They start in Lynnhaven River in early spring, before the crabs begin moving about, and get good prices for their early catch, but when the Hampton fishermen begin fishing the price usually drops, and as the Lynnhaven fishermen are handicapped for want of convenient market they have about all abandoned crab fishing by early June. Hampton is, by far, the most important locality in the State for the crab industry, 33 of the 56 vessels hailing from this region. There are 15 wholesale dealers here, 2 of whom handle canned crab meat. These dealers take practically the entire catch of the dredge boats in addition to the trot-line catch of this (Elizabeth City) and other counties.

Crabs are canned only during the summer months, and the crabs used for this purpose are consequently taken by trot lines. The line fishing begins as soon as the water becomes warm enough to cause the crabs to move from the mud in which they have been bedded for the winter for protection from the cold, usually some time in April or early May, and continues through the summer until the cold forces the crabs to again seek the mud bottom. In some sections, however, the line fishing slackens during the extremely hot summer months, this being especially true of those places where the shipping facilities are not favorable. The dredging season usually opens some time during November, usually about the middle of the month, as soon as the crabs have bedded, and extends throughout the winter until the water warms sufficiently to start the crabs from their winter beds. Dredging is mostly done in the lower part of the bay, and sometimes outside the capes when the sea is not too rough. The entire winter catch is picked and sold as fresh meat. Crab meat weighs 5 pounds to the gallon, and an average of 7 crabs will yield 1 pound of meat.

A table showing the details of the industry in Maryland and Virginia follows. There are given also comparative statistics of the catch for a number of years, beginning with 1880. The output in 1915 was the largest for any year for which data are available, and the value then was 50 per cent more than in 1908, the last previous year for which the Bureau had collected complete returns. The information at hand, however, points to a catch in 1915 much short of that a few years before, and the climax of the fishery seems to have been reached about 1912.

CRAB INDUSTRY OF MARYLAND AND VIRGINIA, 1915.

Items.	Maryland.		Virginia.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.
Persons engaged:						
On vessels fishing.....	33		189		222	
On vessels transporting.....	8				8	
In shore or boat fisheries.....	4,053		1,922		5,975	
Shoresmen.....	3,218		867		4,085	
Total.....	7,312		2,978		10,290	
Vessels, boats, apparatus, and other property:						
Vessels fishing.....	16	\$5,450	56	\$139,100	72	\$144,550
Net tonnage.....	94		497		591	
Vessels transporting.....	4	4,200			4	4,200
Net tonnage.....	26				26	
Gasoline boats.....	1,304	181,475	283	61,160	1,587	242,635
Sail and row boats.....	3,053	119,245	1,693	28,774	4,746	148,019
Apparatus vessel fisheries:						
Dredges.....			182	4,511	182	4,511
Scrapes.....	71	183	18	54	99	237
Apparatus shore fisheries:						
Dredges.....			30	720	30	720
Scrapes.....	2,484	7,452	250	710	2,734	8,162
Scoop nets.....	1,770	874	641	317	2,411	1,191
Trot lines.....	1,525	8,741	1,139	7,449	2,664	16,190
Seines.....	29	111			29	111
Shore and accessory property.....		157,896		124,355		282,251
Total.....		485,627		367,150		852,777
Products:						
Vessel fisheries—						
With dredges—Hard crabs, pounds.....			3,596,400	81,246	3,596,400	81,246
With scrapes—						
Hard crabs..... pounds.....	26,962	577	11,804	265	38,766	842
Soft crabs..... do.....	85,772	3,875	52,332	2,355	138,104	6,230
Total.....	112,734	4,452	3,660,536	83,866	3,773,270	88,318

CRAB INDUSTRY OF MARYLAND AND VIRGINIA, 1915—Continued.

Items.	Maryland.		Virginia.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.
Products—Continued.						
Shore fisheries—						
With dredges—Hard crabs, pounds.			599,600	\$13,682	599,600	\$13,682
With scrapes—						
Hard crabs.....pounds.	1,444,435	\$25,190	219,086	5,063	1,663,521	30,253
Soft crabs.....do.	3,601,394	152,626	564,109	24,685	4,165,503	177,311
With scoop nets—						
Hard crabs.....do.	1,100,422	20,908	295,397	6,681	1,395,819	27,589
Soft crabs.....do.	3,530,898	157,024	867,797	47,362	4,398,695	204,386
With trot lines—						
Hard crabs.....do.	19,919,856	288,700	14,042,861	135,817	33,962,717	424,517
Soft crabs.....do.	364,877	14,266			364,877	14,266
With seines—Soft crabs...do.	19,266	1,485			19,266	1,485
Total.....	29,981,148	660,199	16,588,850	233,290	46,569,998	893,459
Grand total.....	^a 30,093,882	664,651	^b 20,249,386	317,156	^c 50,343,268	981,807
Wholesale and canning trade:						
Wages.....		191,840		67,012		258,852
Barrels, boxes, cans, and packing materials used.....		104,529		38,553		143,082
Crabs canned.....cans.					478,104	91,465

^a 90,281,646 in number.^b 60,748,158 in number.^c 151,029,804 in number.

COMPARATIVE STATISTICS OF THE CRAB PRODUCT OF MARYLAND AND VIRGINIA FOR VARIOUS YEARS FROM 1880 TO 1915.

Year.	Maryland.							
	Crabs, hard.		Crabs, soft.		Total.			
	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>
1880.....	1,166,667	\$46,850	(a)		1,166,667		1,166,667	\$46,850
1887.....	2,757,638	36,969	1,636,530	\$133,788	4,394,168		170,757	
1888.....	2,674,675	37,438	2,208,829	161,331	4,883,504		198,769	
1890.....	2,388,099	31,723	4,056,110	228,690	6,444,209		260,413	
1891.....	2,776,898	37,460	4,828,872	266,256	7,605,770		303,716	
1897.....	5,333,316	39,949	4,115,879	177,637	9,449,195		217,586	
1901.....	9,824,793	85,884	4,303,582	202,563	14,128,375		288,447	
1904.....	12,665,282	168,996	5,732,865	189,851	18,398,147		358,847	
1908 ^b	12,786,000	124,000	7,587,000	195,000	20,373,000		319,000	
1915.....	22,491,675	335,375	7,602,207	329,276	30,093,882		664,651	

Year.	Virginia.							
	Crabs, hard.		Crabs, soft.		Total.		Grand total.	
	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>
1880.....	2,139,200	\$32,088	(a)		2,139,200	\$32,088	3,305,867	\$78,938
1887.....	626,820	15,479	(a)		626,820	15,479	5,020,988	186,236
1888.....	956,843	24,669	(a)		956,843	24,669	5,840,347	223,438
1890.....	2,584,794	28,210	440,310	\$26,054	3,025,104	54,264	9,469,313	314,677
1891.....	2,208,071	32,683	585,956	29,379	2,794,027	62,062	10,399,797	365,778
1897.....	5,331,398	28,331	1,068,116	39,914	6,399,514	68,245	15,848,709	285,831
1901.....	6,113,277	52,863	1,288,424	65,972	7,401,701	118,835	21,530,076	407,282
1904.....	10,356,052	179,575	1,910,654	92,909	12,266,706	272,484	30,664,853	631,331
1908 ^b	23,001,000	239,000	2,082,000	87,000	25,083,000	326,000	45,456,000	645,000
1915.....	18,765,148	242,754	1,484,238	74,402	20,249,386	317,156	50,343,268	981,807

^a Statistics not available.^b The statistics for 1908 are from data published by the Bureau of the Census.

SHAD AND ALEWIFE INDUSTRY OF CHESAPEAKE BAY AND TRIBUTARIES.

In view of the large interests dependent on the perpetuation of the supply of shad and alewives, or river herring, in the Chesapeake Basin, the Bureau in 1915 made a complete canvass of the industries connected with these fishes, for the purpose of being in position to substantiate the often expressed opinion that radical action was demanded of the States in order to prevent commercial extermination. The results of the canvass were promptly published in a statistical bulletin, which was at once sent to the governors and legislators of Maryland and Virginia, accompanied by three large charts showing the actual location of each pound net and gill net set for shad in 1915 on certain sections of the western shore of Virginia. The data thus supplied are thought to have influenced the Virginia Legislature, in its closing hours, to pass an act, effective in 1917, which will have the effect of permitting a larger portion of the run of spawning fish to reach their spawning grounds. This act, if its object is realized, will supplement in an effective way the protection that has heretofore been afforded to the migrating fish by the War Department through the insistence that certain lanes for navigational purposes shall be left in the maze of set nets on the shores of Chesapeake Bay and its major tributaries.

The fishery for alewives is closely connected with that for shad, the same apparatus being used and the seasons being coincident. The canvass therefore included the alewives as well as the shad, and the published bulletin, herein reprinted, gives the statistics of both fisheries.

The catch of shad in Maryland in 1915, compared with that of 1909, the latest previous year for which statistics are available, declined more than 50 per cent in quantity and about 29 per cent in value, and the catch of alewives decreased nearly 47 per cent in quantity and about 15 per cent in value. Chesapeake Bay, in Maryland, showed a decline of about 45 per cent in the shad catch and 31 per cent in the alewife catch. A still larger decrease occurred in some of the more important rivers. In the Susquehanna River, in Maryland and Pennsylvania, there was a decrease of 88 per cent in the shad and 88 per cent in the alewife catch. In the Choptank River and tributaries there was a decrease of 83 per cent in the catch of shad and 84 per cent in that of alewives. In the Potomac River the shad catch decreased 11 per cent and the alewife catch 74 per cent. In the Northeast River, which was the only one of importance which did not show a decided decline in these species, the catch of shad fell off less than 10 per cent and that of alewives increased 47 per cent.

The catch of shad in the Patuxent River in 1915 amounted to 1,118 in number, compared with 7,485 in 1909, 9,577 in 1904, 43,000 in 1901, and 52,354 in 1896, the only years for which statistics are available. The alewife catch fell off from 796,300 in 1909 to 20,400 in 1915.

The Elk River has never been a prolific shad stream, but has always furnished large quantities of alewives. The largest output of shad was in 1904, when 8,850 were taken. The catch of alewives in this river was 6,736,000 in 1909 and 3,608,950 in 1915.

The decreased run of shad and alewives in the Chesapeake Bay basin of Maryland, Delaware, and Pennsylvania in 1915 resulted in a noticeable decline in the amount of all forms of apparatus used for their capture.

In Virginia the catch of shad in 1915, compared with 1909, decreased 1,316,066 pounds, or 21.82 per cent in quantity, but increased \$169,674, or 34.74 per cent, in value, and the catch of alewives decreased 11,733,850 pounds, or 42.22 per cent in quantity, and increased \$37,575, or 29.26 per cent, in value.

The pound nets fished in Virginia in these waters during the season of 1915, compared with 1909, show a decrease of 31, but the number of gill nets increased from 7,121 in 1909 to 16,793 in 1915. The total catch of shad in Virginia during the year was 1,629,872 in number, or 4,714,134 pounds, valued at \$658,010, and that of alewives was 40,135,328 in number, or 16,054,130 pounds, valued at \$165,950.

In the Potomac River there were but two seines fished during the season of 1915 for herring and shad—one on the Maryland side at Chapmans Point and the other on the Virginia side at Stony Point. There are very few pound nets along the Maryland side of this river, but quite a number of large traps on the Virginia side off Northumberland County near the mouth. The alewife fisheries of Westmoreland County were quite extensive up to a few years ago, and it was in this county that the canning of the roe originated. Several large packing houses were located in this county as recently as 1909, but now there is but one, and that very small. There are a number of large packing houses in that part of Northumberland County bordering on the Potomac, or rather in Com River and Yeocomico River, which are tributary to the Potomac. Both alewives and roe are packed in large quantities at these points. Drift gill nets are not fished for shad below Maryland Point, and from this place they are used in various locations up to Jones Point, a short distance below Alexandria. The gill-net catch of 1915 was reported by fishermen as the lightest they had ever taken, and many of them made little more than expenses. Some fishermen of Northumberland County along the Potomac reported the herring and shad catch for 1915 as very gratifying and thought that it was the best they have had for several seasons.

The total number of pound nets fished in Virginia during the year was 2,012, valued at \$408,675. Of these, 527, or about 26 per cent, valued at \$107,200, were fished by Mathews County fishermen. Elizabeth City County ranks second in the number of pound nets, having 317, valued at \$73,900; Accomac County third, with 273 nets, valued at \$48,150; followed by Northumberland County with 269, valued at \$73,250, and Gloucester County with 204, valued at \$33,100.

The catch for 1915 showed a great many more bucks than for the average year, and many of these were smaller than usual. This seemed to be the case on all parts of the bay.

In the James River stake gill nets are the leading form of apparatus used for shad fishing. The only drifting grounds remaining are located quite a distance up the river, and the catch with drift nets was negligible in the 1915 season. During the summer of 1909, when a canvass of the shad fisheries was made on this river, very few stake nets were found above Ferguson's Wharf, now called Rushmere, located in Isle of Wight County about 12 miles above Newport News.

Such nets are now found at various points up as far as Tar Bay, near Coggins Point, within a short distance of the mouth of Appomattox River. The shad run appeared in 1915 about March 15 to 20, though a few stray fish were seen earlier, and the gill-net fishing was practically over by the third or fourth week in May. Gill nets can not be used after the water is warm enough to start the crabs, as these hang in the nets and interfere too much with the handling of them. The run was much lighter than usual, but the greater part of the gill-net catch was roe fish, and the high price received partly made up for the decrease in the catch.

The apparatus used in the Chickahominy River consists entirely of seines and drift gill nets, and the catch includes shad and other species. Pound nets are not permitted in this river.

In the Rappahannock River stake gill nets having 2 $\frac{1}{4}$ -inch mesh are fished during the winter for perch and discontinued when the shad season opens. The shad nets are then used on the same stands, being the same length as the perch nets but of a larger mesh. Herring do not usually figure in the catch of the perch nets, but there was an early run of branch herring in 1915 and some of the nets made fairly good catches. The fishermen received as high as \$20 per thousand for these early herring. Some herring are caught also in the small pound nets in this river, and the average price for these was about \$10 per thousand.

The number of persons engaged in the shad and alewife industries of Chesapeake Bay and tributaries in 1915 was 8,839, of whom 6,612 were fishermen and 2,227 were employed in shore industries. The investment in boats, fishing apparatus, shore and accessory property, and cash capital amounted to \$1,528,824. The products of these fisheries aggregated 2,129,486 shad in number, or 6,225,549 pounds, valued at \$857,771, and 71,571,278 alewives in number, or 28,628,510 pounds, valued at \$297,899, a total value for both species of \$1,155,670. Compared with the returns for 1909, there was a decrease of 258 in the number of pound nets and an increase of 7,968 in the number of gill nets operated. The catch of shad decreased 3,114,219 pounds, but increased \$88,322 in value, and the catch of alewives decreased 22,803,590 pounds and increased \$13,855 in value.

Statistics by States of the shad and alewife industry of Chesapeake Bay and tributaries in 1915, and also comparative statistics for Maryland and Virginia for various years from 1880 to 1915, and by waters for certain years from 1896 to 1915, are given in detail in the following tables.

SHAD AND ALEWIFE INDUSTRY OF CHESAPEAKE BAY AND TRIBUTARIES, 1915.

Items.	Pennsylvania.			Delaware.			Maryland.			Virginia.			Total.	
	Number.	Pounds.	Value.	Number.	Pounds.	Value.	Number.	Pounds.	Value.	Number.	Pounds.	Value.	Pounds.	Value.
Persons engaged:														
Fishermen	192			70			2,388			3,902			6,612	
Shoemen							1,034			1,193			2,227	
Total	192			70			3,422			5,155			8,839	
Boats, apparatus, and other property:														
Gasoline boats							a 559		\$147,510	659		\$230,080	1,218	\$377,590
Sail and row boats	110		\$1,360	33			b 555		19,723	1,091		20,355	1,789	41,838
Apparatus—														
Pound nets							1,062		104,920	2,012		408,675	3,074	570,595
Stake gill nets							2,172		6,209	16,207		16,325	18,439	22,534
Drit and anchored gill nets	8			68		912	1,703		33,293	526		14,333	2,297	48,538
Seines	150		660	2		400	17		7,925	8		3,795	35	12,780
Dip nets			300				53		230				203	530
Shore and accessory property														
Cash capital									121,622			125,137		246,819
Total			2,320			1,712			35,000			172,600		207,600
									333,432			991,300		1,528,824
Products:														
With pound nets														
Shad							312,182	998,635	118,395	1,347,482	3,782,574	523,670	1,659,664	642,065
Alewives (herring)							23,874,350	9,549,740	105,849,653	13,801,200	160,762,631	927,330	25,410,940	266,611
With stake gill nets—														
Shad							21,320	70,075	9,612	158,605	594,508	77,509	179,925	87,211
Alewives (herring)										99,900	39,900	1,998	90,000	1,998
With drit and anchored gill nets—														
Shad				7,850	25,000	3,500	130,342	422,259	57,251	115,381	380,922	54,479	256,563	115,329
Alewives (herring)							90,000	35,000	475	250,000	100,000	2,500	340,000	2,975
With seines—														
Shad	6,100	18,300	2,650	1,100	3,080	429	10,299	32,280	3,394	5,404	16,130	2,262	22,903	8,735
Alewives (herring)				17,000	6,800	170	7,454,000	2,981,840	25,455	132,428	52,970	600	7,004,028	3,041,010
With dip nets—shad	3,000	10,500	1,575				7,431	20,997	2,865				10,431	4,440
Total shad	9,100	28,800	4,225	8,950	28,080	4,019	481,564	1,451,535	191,517	1,629,872	4,714,134	638,010	2,120,486	837,771
Total alewives (herrings)				17,000	6,800	170	c 31,418,950	12,567,580	131,779	40,135,328	16,054,130	105,950	71,571,278	28,028,510
Grand total			4,225			4,189			323,296			823,990		1,155,670

Wholesale and canning trade.					
Wages.....					05,885
Barrels, boxes, cans, and salt used.....					88,347
Salt alewives (herring), barrels.....					292,173
Corned alewives (herring). Canned alewives (herring), cans.....	20,227 1,624,300 27,144	4,091,400 649,720 24,093	103,278 8,844 1,331	35,938 7,237,700 839,100	1,283,000 3,544,800 24,093
Canned alewives (herring) roe.....	351,888	374,404	34,046	944,055	117,367
					1,318,459
					31,091
					55,919
					7,191,600
					8,862,000
					27,144
					1,191,048
					1,318,459

a Includes one steamer valued at \$2,500.

^a Includes one steamer valued at \$2,500.

^b Includes 3 vessels of 24 net tons, valued at \$2,450, used as house-boats.

STATISTICS OF THE SHAD AND ALEWIFE PRODUCT OF MARYLAND AND VIRGINIA FOR VARIOUS YEARS FROM 1880 TO 1915. *a*

Years.	Maryland.			Virginia.			Grand total.				
	Shad.	Alewives.		Total value.	Shad.	Alewives.		Total value.	Shad.	Alewives.	
		Pounds.	Value.			Pounds.	Value.			Pounds.	Value.
1880	3,774,426	\$140,926	9,203,959	\$139,667	\$280,578	3,171,953	\$134,496	\$76,300	8275,192	16,129,372	\$215,967
1881	4,040,820	146,951	11,062,270	89,273	236,224	3,815,126	172,272	201,837	15,934,416	15,433,416	118,858
1882	4,988,435	176,555	11,511,774	110,221	286,946	7,056,473	321,634	40,369	19,981,299	17,981,299	150,660
1883	7,127,486	242,990	19,766,994	143,793	385,702	7,268,207	228,897	91,674	21,753,693	21,753,693	235,467
1884	6,224,873	211,575	17,418,850	131,245	342,820	6,498,242	207,394	10,611,638	19,729,115	19,729,115	225,150
1885	5,541,499	166,551	17,637,315	126,050	212,601	11,170,519	307,055	12,137,607	17,712,018	17,712,018	189,074
1886	5,799,593	198,365	17,439,459	123,453	282,818	11,529,474	304,448	70,834	19,563,937	19,563,937	194,274
1887	3,111,181	120,902	13,747,157	91,308	211,910	6,972,212	366,203	113,541	17,883,393	17,883,393	206,792
1888	2,912,219	159,772	14,484,970	137,982	297,754	7,410,889	439,625	10,332,148	19,397,397	19,397,397	228,715
1889	3,912,400	247,000	18,805,000	157,400	404,000	7,314,000	486,000	17,885,000	20,660,000	20,660,000	328,000
1890	3,252,688	272,869	23,637,320	155,499	428,368	6,030,200	488,356	127,787,960	19,251,000	19,251,000	283,874
1891	1,454,535	191,517	12,567,580	131,779	323,296	4,714,134	658,010	165,950	6,168,669	6,168,669	297,729
1915									849,527	28,621,710	

myself, and aluminum in these States outside of the Chesapeake Bay region is included for some years, but is practically negligible.

^x The catch of shad and alewives in these States outside of the Chesapeake Bay region is small. The statistics for 1908 in this table are from data published by the Bureau of the Census.

REPORT OF THE COMMISSIONER OF FISHERIES.

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	850	177	866	16	5	70	25	57,000	137	705,000	1,565
Gumpowder River.....								442,500	1,327		
Bush River.....								8,741,500	33,735	1,070,000	3,870
Susquehanna River:								25,000	75		
Maryland.....	69,488	8,874	39,275	65,717	19,379	6,585	2,359				
Pennsylvania.....	70,599	23,412	70,521	19,867	22,224	9,100	4,225				
Total.....	140,087	32,286	115,796	125,762	41,603	15,685	6,584	8,765,500	33,810	1,070,000	3,870
Northeast River:								3,740,000	9,500	5,504,000	27,105
Pile River.....	60,620	6,382	(b)	62,375	14,627	56,247	21,917	6,736,000	11,251	3,608,950	18,194
Sassaparilla River.....	5,214	478	8,850	1,053	287	1,426	324	3,527,000	10,285	1,125,000	6,170
Chesapeake River.....	1,290	298	8,150	1,592	91	386	150	646,500	1,771	243,000	1,057
St. Michaels River.....	53,507	739	4,215	5,718	1,711	1,565	574				
Eastern Bay.....	2,215										
Choptank River and tributaries:								269,500	462	95,000	355
Pocomoke River.....	38,420	20,918	40,267	108,956	32,725	17,960	7,016	2,072,000	4,771	336,000	1,596
Fishing Bay.....	1,555	266	718	118				4,000	20		
Blackwater River.....	9,790	905	10,890	1,801	210			116,000	232		
Transquaking River.....	13,694	553	2,088	497	840			33,000	83		
Nantuxet River:											
Maryland.....	125,181	5,977	31,028	21,945	6,583	8,710	4,005	105,727	271	3,000	12
Delaware.....	52,467	6,315	22,450	7,700	2,310	8,950	4,019	30,000	90	17,000	170
Total.....	177,648	12,292	53,478	29,645	8,893	17,660	8,024	135,727	361	20,000	182
Marshhope Creek.....											
Wicomico River.....	38,660	3,865	(c)	14,475	4,242	2,371	1,092	28,000	216		
Manokin River.....	68,015	4,500	5,046								
Pocomoke:											
Virginia.....	29,752	414	1,550	5,600	1,960			55,000	412		
Maryland.....	29,752	4,004	13,995	24,130	8,445	9,734	3,977	30,000	75		
Total.....	59,504	4,418	15,545	29,730	10,405	9,734	3,977	85,000	187		
Tangier Sound:											
Virginia.....	21,257	155	1,000	49,776	17,217	42,916	16,713	612,000	1,685	1,311,400	5,246
Maryland.....	1,416			55,272	17,530	32,065	12,578	418,273	1,032	250,300	1,001
Total.....	22,673	155	1,000	105,018	34,847	74,981	29,321	1,060,273	2,717	1,561,700	6,247
Pocomoke Sound:											
Virginia.....	8,320	917		15,400	5,300	5,157	1,910	305,000	1,376	103,500	414
Maryland.....	7,149	560	5,300	2,500	875	1,965	771	55,000	136	40,000	100
Total.....	15,469	500	5,360	17,900	6,265	7,122	2,714	360,000	1,512	143,500	574
Grand total.....	4,867,619	516,339	2,952,042	785,739	2,129,486	857,771	128,618,249	284,039	71,571,278	297,599	

^a Includes all tributaries of Chesapeake Bay except the James, Potomac, and Pocomoke Rivers. ^b Included with Chesapeake Bay. ^c Included with Nantuxet River.

NUMBER OF POUND NETS, THE CATCH OF SHAD AND ALEWIVES, AND THE AVERAGE CATCH OF EACH SPECIES PER NET FOR CERTAIN SECTIONS OF CHESAPEAKE BAY AND POTOMAC RIVER, 1915.

Locality.	Number of pound nets.	Number of shad.	Number of alewives.	Average number of shad to net.	Average number of alewives to net.
From Cape Henry to Tue Point (lower side of York River mouth).....	496	268,374	1,974,490	541	3,980
From York Spit (inclusive) to Stingray Point.....	623	491,196	4,437,345	772	7,122
From Rappahannock Spit (inclusive) to Smith Point.....	276	291,266	21,667,166	1,054	78,504
Potomac River.....	211	147,271	7,336,000	697	34,760

COASTAL FISHERIES OF NEW YORK AND NEW JERSEY.

Following a conference with the fishery authorities of the States of New York and New Jersey in January, 1916, regarding the condition of the coastal fisheries of those States and the measures necessary for their conservation, the Bureau undertook, by request, the canvass of those fisheries so that their actual extent might be known. The field work was completed in June and the results of the canvass were communicated to those interested. The figures related to the calendar year 1915 and covered only fishes proper.

In New York the number of persons engaged in the coastal fisheries was 2,504, and the investment in vessels, boats, fishing apparatus, and shore and accessory property was \$1,771,166. The products amounted to 34,617,775 pounds of fish, valued at \$1,121,611. Some of the more important species taken were bluefish, 6,107,113 pounds, valued at \$492,928; butterfish, 1,244,475 pounds, valued at \$51,636; cod, 1,259,160 pounds, valued at \$59,400; eels, 426,330 pounds, valued at \$34,387; flounders, 3,440,053 pounds, valued at \$96,337; mackerel, 342,489 pounds, valued at \$25,620; menhaden, 14,518,812 pounds, valued at \$100,935; scup, 1,026,736 pounds, valued at \$44,447; sea bass, 973,686 pounds, valued at \$44,894; and squeteague, 1,859,143 pounds, valued at \$98,324.

In New Jersey there were 2,303 persons employed in the coastal fisheries, and the investment amounted to \$1,192,657. The products aggregated 47,856,176 pounds of fish, valued at \$1,348,667. The species taken in largest quantities were bluefish, 2,728,779 pounds, valued at \$177,906; butterfish, 5,462,917 pounds, valued at \$151,677; cod, 679,133 pounds, valued at \$31,896; croaker, 2,684,719 pounds, valued at \$47,366; eels, 377,698 pounds, valued at \$28,257; flounders, 1,531,376 pounds, valued at \$58,413; mackerel, 367,307 pounds, valued at \$26,161; menhaden, 4,354,789 pounds, valued at \$36,602; scup, 3,279,693 pounds, valued at \$94,776; sea bass, 6,171,922 pounds, valued at \$203,163; squeteague, 14,121,330 pounds, valued at \$358,977; and whiting, 2,407,217 pounds, valued at \$36,367.

The statistics of these fisheries, by counties, are given in detail in the following table:

STATISTICS OF COASTAL FISHERIES OF NEW YORK AND NEW JERSEY, BY COUNTIES,
EXCLUSIVE OF SHELLFISH, 1915.

NEW YORK.

Items.	Kings, New York, Queens, and Rich- mond Counties.		Nassau County.		Suffolk County.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Persons engaged...	841		119		1,544		2,504	
Vessels fishing...	57	\$306,395	4	\$5,850	84	\$763,896	145	\$1,076,141
Tonnage.....	2,576		32		2,371		4,979	
Outfit.....		145,225		620		49,256		195,101
Vessels trans- porting.....					21	52,720	21	52,720
Tonnage.....					266		266	
Outfit.....						2,240		2,240
Sail, row, and house boats....	11	225	39	890	474	16,160	524	17,275
Gasoline boats..	4	2,850	34	14,750	282	112,025	320	129,625
Pound nets.....	4	2,800			460	114,215	464	117,015
Seines.....	20	17,900	23	1,173	117	37,010	160	56,083
Gill nets.....	100	1,100	84	3,375	469	11,670	653	16,145
Fyke nets.....					5,373	24,152	5,373	24,152
Lines.....		4,500		635		1,838		6,973
Otter trawls....					156	3,815	156	3,815
Eelpots.....	250	275	390	430	5,055	5,503	5,695	6,208
Other apparatus..				2,276		112		2,388
Shore and acces- sory property..		650		1,050		63,585		65,285
Total.....		481,920		31,049		1,258,197		1,771,166
Products:								
Albacore and horse mackerel...	Pounds. 430	Value. \$25	Pounds. 500	Value. \$10	Pounds. 4,450	Value. \$129	Pounds. 4,880	Value. \$154
Alewives.....	11,000	140	500	\$10	523,605	7,214	535,105	7,364
Bluefish.....	5,790,205	466,322	27,200	2,690	289,708	23,716	6,107,113	492,928
Bonito.....	1,054	100	300	30	11,795	1,157	13,149	1,287
Butterfish.....	60,000	1,800			1,184,475	49,836	1,244,475	51,636
Carp.....					102,300	7,592	102,300	7,592
Cod.....	723,375	32,855	201,000	9,550	334,785	16,995	1,259,160	59,400
Croaker.....	14,949	336			10,000	350	24,949	686
Eel.....	5,630	532	32,900	3,395	387,800	30,460	426,330	34,387
Flounders.....	28,123	838	115,000	3,240	3,296,930	92,259	3,440,053	96,337
Haddock.....	34,041	1,238	2,000	100	49,550	2,573	85,591	3,911
Hake.....	2,044	63	8,500	200	52,725	1,238	63,269	1,501
Hog choker.....					7,200	60	7,200	60
Kingfish.....	89	18			31,005	3,170	31,084	3,188
Mackerel.....	9,360	968	6,800	630	326,329	24,022	342,489	25,620
Menhaden.....	2,632,100	19,307	6,000	60	11,880,712	81,568	14,518,812	100,935
Mullet, fresh..					5,113	203	5,113	203
Mummichog....			8,000	40	138,250	1,023	146,250	1,063
Pike.....					800	96	800	96
Pollock.....	16,170	529	30,000	900	35,540	1,465	81,710	2,894
Scup, or porpy..	511,476	20,574			515,260	23,873	1,026,736	44,447
Sea bass.....	270,263	14,398	150,000	2,500	553,423	27,996	973,686	44,894
Sea robins.....	2,657	29			97,905	1,251	100,562	1,280
Shad.....	5,250	785			14,705	1,365	19,955	2,150
Sharks.....	20,975	84			19,225	192	40,200	276
Skates.....	7,700	77			204,463	1,360	212,163	1,437
Smelt.....			2,300	350	4,450	1,320	6,750	1,670
Spanish mack- erel.....	529	162	50	10	20	2	599	174
Spot.....					1,500	60	1,500	60
Squeteague.....	592,254	22,477	56,950	3,022	1,209,939	72,825	1,859,143	98,324
Squid.....	1,200	12			556,425	8,306	557,625	8,318
Striped bass....			2,200	344	14,700	2,460	16,900	2,804
Sturgeon.....					3,826	673	3,826	673
Sturgeon caviar.					241	248	241	248
Swellfish.....					50,225	370	50,225	370
Swordfish.....					7,362	756	7,362	756
Tautog.....	881	38	100	5	98,100	3,989	99,081	4,032
Tilefish.....	a 183,484	7,748					183,484	7,748
Tomcod.....					70,157	2,716	70,157	2,716
White bait.....					28,200	2,220	28,200	2,220
White perch....					19,400	2,038	19,400	2,038
Whiting.....	1,000	10			328,925	3,742	329,925	3,752
Other fish.....					213	12	213	12
Total.....	10,926,239	591,665	649,800	27,076	22,471,736	502,900	34,047,775	1,121,641

^a Landed by New York vessels and does not include tilefish landed at New York by vessels from other ports.

STATISTICS OF COASTAL FISHERIES OF NEW YORK AND NEW JERSEY, BY COUNTIES,
EXCLUSIVE OF SHELLFISH, 1915—Continued.

NEW JERSEY.

Items.	Atlantic County.		Bergen and Hudson Counties. ^a		Cape May County.		Middlesex County.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Persons engaged.....	298		43		680		54	
Vessels fishing.....	19	\$71,485			25	\$74,690		
Tonnage.....	349				330			
Outfit.....		25,130				32,725		
Vessels transporting.....	2	3,500			1	50		
Tonnage.....	15				10			
Outfit.....		45						
Sail, row, and house boats.....	63	1,720	16	\$742	38	480	21	\$900
Gasoline boats.....	34	12,250	4	900	130	69,600	8	2,400
Pound nets.....	3	1,950			58	128,325	1	600
Seines.....	42	1,722	5	215	21	3,988	10	4,175
Gill nets.....	45	1,785	10	1,315	192	15,912		
Fyke nets.....	11	460	26	400	48	2,050	4	200
Bag nets.....	15	375						
Lines.....		624		10		3,186		
Eel pots.....	50	45	4	6	202	325	98	98
Other apparatus.....				75				
Shore and accessory property.....		2,420		1,436		38,840		550
Total.....		123,511		5,099		370,171		8,923
Products:								
Albacore and horse mackerel.....	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
	800	\$11			10,220	\$172		
Alewives.....	13,862	329	300	\$30	29,500	474	7,500	\$100
Bluefish.....	163,664	12,004			874,335	55,620	18,900	915
Bonito.....	800	48			17,469	857		
Butterfish.....	49,205	1,041			2,166,453	61,712		
Carp.....			10,650	1,157			12,500	1,100
Cod.....	201,000	9,330			261,870	12,842		
Croaker.....	297,278	6,488			1,063,735	24,515		
Drum.....	480	5			5,550	63		
Eel.....	5,875	419	8,025	670	42,885	4,669	1,800	127
Flounders.....	68,744	2,728			318,044	11,748	4,400	197
Haddock.....					200	10		
Hake.....	200	3			1,249	37		
Kingfish.....	21,068	2,150			17,429	1,925		
Mackerel.....	152,125	10,860			148,232	10,509		
Menhaden.....	1,200,000	14,000			101,331	598	112,569	236
Mullet, fresh.....	5,500	103			34,750	990		
Mullet, salted.....					500	50		
Pollock.....					325	4		
Scup, or porgy.....	840,400	25,109			1,887,117	53,090		
Sea bass.....	1,522,238	49,280			3,943,624	123,796		
Shad.....	115	19	20,104	2,674	170	20	1,705	312
Sharks.....					10,198	143		
Skates.....	1,200	11			89,180	911		
Smelt.....							6,000	1,200
Spanish mackerel.....					270	39		
Spot.....	4,175	132			13,085	304	2,000	60
Squeteague.....	1,634,099	42,613			4,331,759	122,331	88,200	3,013
Squid.....	500	6			289,826	3,617		
Striped bass.....	7,080	1,384					200	25
Sturgeon.....					65	4		
Suckers.....	3,550	226	15,000	1,645				
Tautog.....	600	12			760	19		
White perch.....	27,159	2,373			1,575	145	75	6
Whiting.....					2,000	33		
Yellow perch.....	165	15			450	22		
Other fish.....	1,200	83	5,035	495	180	19		
Total.....	6,226,082	180,782	59,114	6,671	15,664,386	491,288	255,849	7,291

^a Includes men, boats, apparatus, and shore property employed and catch of fish taken in Upper New York Bay and Hackensack River, and also men, boats, apparatus, and shore property employed and catch of shad taken in Hudson River.

STATISTICS OF COASTAL FISHERIES OF NEW YORK AND NEW JERSEY, BY COUNTIES,
EXCLUSIVE OF SHELLFISH, 1915—Continued.

NEW JERSEY—Continued

Items.	Monmouth County.		Ocean and Burling- ton Counties.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.
Persons engaged.....	582		646		2,303	
Vessels fishing.....	3	\$7,300	1	\$1,500	48	\$154,975
Tonnage.....	38		6		723	
Outfit.....		3,900		80		61,835
Vessels transporting.....	2	11,000			5	14,550
Tonnage.....	21				46	
Outfit.....		1,450				1,495
Sail, row, and house boats.....	67	1,655	206	10,436	411	15,933
Gasoline boats.....	179	78,150	154	55,100	509	218,400
Found nets.....	65	83,090	47	127,800	174	341,765
Seines.....	8	2,440	46	2,410	132	14,950
Gill nets.....	155	8,050	1,359	10,626	1,761	37,688
Fyke nets.....	103	1,430	778	5,660	970	10,200
Bag nets.....			75	1,900	90	2,275
Lines.....		2,327		725		6,872
Other trawls.....			1	20	1	20
Eelpots.....	1,424	1,822	3,461	2,685	5,239	4,981
Other apparatus.....		7		30		112
Shore and accessory property.....		118,725		144,035		306,006
Total.....		321,346		363,007		1,192,057
Products:	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Albacore and horse mackerel.....	14,255	\$654	44,987	\$1,095	70,262	\$1,932
Alewives.....	214,270	2,153	351,865	3,779	617,297	6,865
Bluefish.....	1,402,898	87,697	268,982	21,670	2,728,779	177,906
Bonito.....	23,175	1,908	75,878	6,291	117,322	9,104
Butterfish.....	711,881	22,297	2,535,378	66,627	5,462,917	151,677
Carp.....					23,150	2,257
Cod.....	122,908	5,697	93,355	4,027	679,133	31,896
Croaker.....	288,680	7,178	435,626	9,185	2,084,719	47,366
Drum.....	8,600	86			14,630	154
Eel.....	131,238	9,161	187,875	13,211	377,698	28,257
Flounders.....	373,415	15,297	766,773	28,473	1,531,376	58,443
Goosfish.....	40,000	125			40,000	125
Haddock.....					200	10
Hake.....	727,493	9,305	439,683	4,638	1,168,625	13,983
Hickory shad.....	3,500	165			3,500	165
Kingfish.....	5,910	904	13,190	2,188	60,597	7,167
Mackerel.....	50,175	3,490	16,775	1,302	367,307	26,161
Menhaden.....	2,765,830	20,142	175,009	1,626	4,354,789	36,602
Mullet, fresh.....	22,750	910			63,000	2,003
Mullet, salted.....					500	50
Pollock.....	3,500	111	8,999	267	12,824	382
Round herring.....	35,432	717			35,432	717
Scup, or porgy.....	164,950	5,992	387,226	10,585	3,279,693	94,776
Sea bass.....	327,800	16,339	378,260	13,748	6,171,922	203,163
Sea robins.....	35,500	425	41,375	620	76,875	1,045
Shad.....	12,813	2,183	7,230	1,060	42,137	6,268
Sharks.....	84,550	748	17,800	175	112,548	1,066
Skates.....	272,470	1,600	150,716	857	513,566	3,379
Smelt.....					6,000	1,200
Spanish mackerel.....	164	34	621	109	1,055	182
Spot.....	18,950	431	28,450	740	66,660	1,667
Squeteague.....	3,055,048	86,973	5,012,224	104,047	14,121,330	358,977
Squid.....	157,370	2,125	525,975	7,082	973,671	12,830
Striped bass.....	220	44	7,148	1,770	14,648	3,223
Sturgeon.....	2,788	435	500	50	3,353	489
Sturgeon caviar.....	270	272			270	272
Suckers.....			8,700	586	27,250	2,457
Tautog.....	40,650	1,772	3,000	105	45,010	1,908
Tilefish.....	30	3			30	3
Toadfish.....	5,800	80			5,800	80
White bait.....	750	33			750	33
White perch.....			136,130	12,881	164,939	15,405
Whiting.....	1,754,995	26,636	650,222	9,698	2,407,217	36,367
Yellow perch.....					615	37
Other fish.....			365	21	6,780	618
Total.....	12,880,428	334,122	12,770,317	328,513	47,856,176	1,348,667

SHAD FISHERY OF THE HUDSON RIVER.

In connection with the canvass of the coastal fisheries of New York and New Jersey the shad fishery of the Hudson River was covered for the years 1915 and 1916. The statistics are given in the following table, showing for the latter year 119 fishermen, 79 gill nets, 3 seines, and a catch of 9,287 shad, valued at \$5,465. The Hudson was at one time one of the great shad streams, its annual output running into the hundreds of thousands. Thus, in 1896 the number of shad taken was 588,898, valued at \$83,237. The present condition of the shad fishery is most deplorable.

SHAD FISHERY OF THE HUDSON RIVER, 1915 AND 1916.^a

1915.

Items.	New York.			New Jersey.			Total.		
	No.	Lbs.	Value.	No.	Lbs.	Value.	No.	Lbs.	Value.
Fishermen.....	133			27			160		
Sail and row boats.....	81		\$2,975	7		\$430	88		\$3,405
Gasoline boats.....	2		225	2		600	4		825
Gill nets.....	79		3,984	7		1,035	86		5,019
Seines.....	2		190				2		190
Shore and accessory property.....			528			1,230			1,758
Total.....			7,902			3,295			11,197
Shad caught:									
With gill nets.....	11,333	47,333	5,834	4,249	20,104	2,674	15,582	67,437	8,508
With seines.....	62	298	33				62	298	33
With other apparatus incidentally.....	211	933	102				211	933	102
Total.....	11,606	48,564	5,969	4,249	20,104	2,674	15,855	68,668	8,643

1916.

Fishermen.....	108			11			119		
Sail and row boats.....	64		\$2,240	3		\$195	67		\$2,435
Gasoline boats.....	2		225	1		350	3		575
Gill nets.....	76		2,937	3		480	79		3,417
Seines.....	3		350				3		350
Shore and accessory property.....			528			540			1,068
Total.....			6,280			1,565			7,845
Shad caught:									
With gill nets.....	7,536	31,670	4,399	1,500	7,250	925	9,036	38,920	5,324
With seines.....	191	1,008	99				191	1,008	99
With other apparatus incidentally.....	60	245	42				60	245	42
Total.....	7,787	32,923	4,540	1,500	7,250	925	9,287	40,173	5,465

^a Includes Albany, Columbia, Dutchess, Green, Orange, Rennselaer, Rockland, Schuyler, Ulster, and Westchester Counties in New York, and Bergen and Hudson Counties in New Jersey.

NEW ENGLAND VESSEL FISHERIES.

Statistics of the extensive offshore vessel fisheries centering at Boston and Gloucester, Mass., have been collected during the year by the local agents, and published in monthly and annual bulletins showing, by species and fishing grounds, the quantities and values of the fishery products landed by the American fishing vessels at these ports.

The fleet in 1915 was composed of 410 sail, steam, and gasoline screw vessels. These vessels landed at Boston 3,772 trips, aggregating

97,899,487 pounds of fish, valued at \$2,911,314, and at Gloucester 3,472 trips, aggregating 73,696,241 pounds, valued at \$1,826,603. The total for the two ports was 7,244 trips, aggregating 171,595,728 pounds of fresh and salted fish, having a value to the fishermen of \$4,737,917. Compared with the previous year there was a decrease of 354 trips, but an increased production amounting to 9,006,508 pounds in quantity and \$342,887 in value. There was a small decrease in the catch of cod, but an increase in that of practically all the other important species. The value of haddock and cusk was slightly less than that of the previous year. The halibut product increased 491,100 pounds in quantity and \$46,946 in value. The mackerel catch increased 6,688,850 pounds, or over 63 per cent, in quantity, and \$259,354, or 73 per cent, in value. There was some decrease in the take of Newfoundland herring, but an increase in the value. Swordfish increased 739,123 pounds in quantity and \$43,890 in value.

The following tables present in detail (1) by fishing grounds and (2) by months the products of the vessel fisheries of Boston and Gloucester during the calendar year 1915. The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. The grades, or sizes, given for certain species are those recognized in the trade.

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS
DURING THE CALENDAR YEAR 1915, SHOWN BY FISHING GROUNDS.

Fishing grounds.	Number of trips.	Cod.					
		Large (10 pounds and over).		Market (under 10 and over 2½ pounds).		Scrod (1 to 2½ pounds).	
		Fresh.	Salted.	Fresh.	Salted.	Fresh.	Salted.
		Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
LANDED AT BOSTON.							
<i>East of 66° west longitude</i>							
La Have Bank.....	25	141,020	\$5,383	155,543	\$3,288	20,000	\$261
West of Bank.....	38	172,830	5,056	291,755	3,730	20,100	227
Quirau Bank.....	2	15,000	400				
Green Bank.....	1						
Grand Bank.....	3	4,285	543	4,210	86		
St. Pierre Bank.....	1	3,300	104				
Off Newfoundland.....	4						
Cape North.....	1	1,300	36				
Cape Shore.....	167	415,194	14,881	351,093	11,212	85,393	871
Gulf of St. Lawrence.....	5	3,065	121	3,465	89	1,150	22
St. Anne Bank.....	2	3,360	102	1,060	33	175	4
The Gully.....	1	11,000	461	8,000	187		
Roseway Bank.....	1	1,000	25				
<i>West of 66° west longitude.</i>							
Brown Bank.....	282	1,343,950	50,440	2,255,641	45,333	216,774	2,799
Georges Bank.....	507	1,519,392	60,574	2,753,489	64,879	142,071	2,147
Cashes Bank.....	33	64,870	3,311	81,660	2,083	8,027	111
Clark Bank.....	5	22,295	1,088	60,202	1,368	2,325	21
Fijepies Bank.....	10	14,170	755	25,335	626	1,835	23
Tillies Bank.....	1	570	48	1,070	43	540	8
Middle Bank.....	222	159,055	8,531	208,112	5,066	28,086	423
Jeffreys Ledge.....	541	345,375	16,895	457,004	13,147	42,222	712
Frewich Bay.....	50	145,566	5,913	69,260	1,597	3,667	61
South Channel.....	516	663,110	40,226	1,883,970	53,989	241,555	3,530
Nantucket Shoals.....	62	114,508	5,843	1,367,113	13,358	47,352	576
Off Highland Light.....	9	5,740	355	6,175	235	835	12
Off Chatham.....	494	1,365,015	66,469	2,261,528	53,368	226,330	2,758
Off Race Point.....	61						
Bay of Fundy.....	5	7,730	216	13,965	235	340	4
Seal Island.....	1	6,830	126	7,045	93	275	2

LANDED AT GLOUCESTER.
East of 66° west longitude.

La Have Bank.....	230,660	2,408	11,035	\$193	27,120	184	964,811	11,330	28,680	453	
Western Bank.....	987,020	10,189	9,685	183			1,165,560	14,164	45,798	800	
Quebec Bank.....	108,810	1,091	2,960	52			1,110,230	1,297	23,633	398	
Green Bank.....							14,615	183	3,385	60	
Grand Bank.....			14,075	246			33,975	415	81,640	1,282	
St. Peter's Bank.....							171,880	2,149	5,200	91	
Sambro Bank.....	6,780	71					1,675	17			
Bungeo Bank.....											
Off Newfoundland.....	100	1					1,135	11	975	17	
Cape North.....			50	1							
Cape Shore.....	115,250	2,780	5,584	98	520	3	341,890	4,226	13,585	238	
Gulf of St. Lawrence.....	8,783	91	17,490	332	1,115	20	84,905	937	29,270	512	
St. Ann's Bank.....	12,760	140	30	1			10,730	134	28,266	474	
The Gully.....	5,230	53					78,240	1,213	3,375	39	
									7,105	120	
<i>West of 66° west longitude.</i>											
Browns Bank.....	1,410,412	17,601	5,215	91	12,540	122	506,533	5,849	11,915	207	
Georges Bank.....	4,835,132	50,480	61,926	1,100	777,963	5,693	68,442	838	2,646	43	
Cashes Bank.....	12,070	126					244,600	2,467			
Flores Bank.....							13,675	137			
Jefferys Ledge.....	1,075	11					78,435	784			
Isle of Pines.....	1,725	17					3,885	39			
South Channel.....	400,245	4,128			235,025	1,639	29,680	367			
Narviket Shoals.....	740	8	2,300	40							
Bay of Fundy.....							46,900	469			
Shore, general.....	776,216	28,242	234	4	5,690	67	951,171	17,075	10,152	178	
Total.....	8,913,010	117,437	130,594	2,361	1,060,575	7,728	4,926,412	64,326	295,625	4,932	
Grand total.....	44,948,106	1,131,660	130,594	2,361	12,864,944	173,792	7,769,018	157,516	300,625	5,007	119,954
									6,820,267		

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS
DURING THE CALENDAR YEAR 1915, SHOWN BY FISHING GROUNDS—Continued.

Fishing grounds.	Pollock.			Cusk.			Halibut.		
	Fresh.		Salted.	Fresh.		Salted.	Fresh.		Salted.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.
LANDED AT BOSTON.									
<i>East of 66° west longitude.</i>									
La Have Bank.....	17,428	\$277	419				6,647	\$1,098	
Western Bank.....	18,680			76,088	\$1,192		22,504	2,354	
Quebec Bank.....				1,995	29		25,338	3,577	
Green Bank.....							5,000	3,500	
Grand Bank.....	555	11					60,000	3,780	
St. Peters Bank.....							30,000	2,400	
Off Newfoundland.....							55,000	4,400	
Cape North.....							35,000	3,150	
Cape Shore.....	51,987	1,204		155,345	2,222		28,743	3,523	
Gulf of St. Lawrence.....							160,000	10,400	
St. Ann's Bank.....	185	3		200	3		47	3	
The Gully.....							231	19	
Roseway Bank.....									
<i>West of 66° west longitude.</i>									
Browns Bank.....	334,709	7,051		1,371,140	20,386		191,392	28,372	
Georges Bank.....	484,521	10,775		71,038	1,071		124,512	16,700	
Cashes Bank.....	22,490	530		190,471	3,079		2,023	261	
Clark Bank.....	5,355	104		10,135	130		2,406	354	
Fippinies Bank.....	6,315	161		49,985	854		420	70	
Tillies Bank.....	1,350	41		600	1				
Middle Bank.....	253,397	6,444		190,965	3,345		8,087	1,225	
Jeffreys Ledge.....	998,231	20,054		479,201	8,511		7,771	1,318	
Ipswich Bay.....	17,700	15		9,100	165		31	4	
South Channel.....	498,737	12,101		148,307	2,236		86,968	12,504	
Nantucket Shoals.....	42,275	\$25		12,195	215		4,173	448	
Off Highland Light.....	2,415	66		3,100	53		1,176	114	
Off Chatham.....	1,224,002	26,972		83,362	1,609		26,394	3,551	
Bay of Fundy.....	3,470	44		49,965	686		120	25	
Seal Island.....	955	12		14,720	155		584	57	
Shore, general.....	299,340	7,204		413,741	7,212		7,242	910	
Total.....	4,281,447	103,733		3,321,681	53,127		930,409	102,327	

LANDED AT GLOUCESTER.

East of 66° west longitude.

La Have Bank.....	28,530	267	5,795	\$102	539,944	7,563	5,295	\$133	80,412	6,544	.....	.....
Western Bank.....	58,525	536	3,635	64	462,095	6,764	14,125	353	244,487	19,626	2,525	\$152
Queen Bank.....	4,461	45	8,193	144	38,449	569	12,050	300	540,334	40,870	20,609	1,405
Green Bank.....	.....	.....	90	2	300	6	1,040	26	83,115	5,970	114	10
Grand Bank.....	.....	.....	7,775	136	1,820	28	3,680	91	672,373	52,750	41,085	2,462
St. Peter's Bank.....	110	1	.....	.....	270	4	30	1	6,200	558	20	2
Sambro Bank.....	3,455	35	.....	.....	57,605	796	.....	.....	.....	.....	.....	.....
Burgeo Bank.....	.....	.....	.....	.....	455	7	137	3	95,092	5,545	400	40
Bacilien Bank.....	.....	.....	.....	.....	410	7	415	10	31,940	1,930	1,945	117
Off Newfoundland.....	.....	.....	.....	.....	.....	.....	85	2	65,688	3,201	.....	.....
Cape North.....	.....	.....	280	5	.....	.....	2,010	50	2,500	164	510	31
Cape Shore.....	9,460	89	1,640	29	308,917	4,385	10,925	269	100,424	9,269	.....	.....
Gulf of St. Lawrence.....	70	1	26,972	471	15,595	228	930	21	228,504	11,969	116,621	8,575
St. Ann's Bank.....	1,795	18	.....	.....	550	8	.....	.....	.....	.....	.....	.....
The Gully.....	2,835	57	255	4	10,212	151	3,075	76	266,516	22,791	275	21
Labrador Coast.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102,151	8,673
<i>West of 66° west longitude.</i>												
Browns Bank.....	58,820	593	1,950	31	864,602	13,196	8,200	206	64,784	4,522	.....	.....
Georges Bank.....	151,978	1,500	173,359	2,995	153,170	2,161	31,150	761	171,397	13,817	305	21
Cashes Bank.....	8,320	75	.....	.....	167,068	2,417	.....	.....	.....	.....	.....	.....
Fippenies Bank.....	.....	.....	.....	.....	7,280	116	.....	.....	.....	.....	.....	.....
Tedreys Ledge.....	.....	.....	.....	.....	91,250	1,458	.....	.....	.....	.....	.....	.....
Tedreys Bay.....	870	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ipswich Bay.....	1,385	13	.....	.....	530	7	.....	.....	.....	.....	.....	.....
South Channel.....	4,880	44	2,850	50	940	15	.....	.....	.....	.....	.....	.....
Nantucket Shoals.....	2,945	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bay of Fundy.....	360	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shore, general.....	8,335,067	142,144	1,846	37	192,568	2,990	1,796	45	.....	.....	.....	.....
Total.....	8,676,866	145,455	234,640	4,070	2,914,120	42,876	94,943	2,347	2,653,766	199,460	286,510	21,503
Grand total.....	12,961,313	249,183	234,640	4,070	6,235,801	96,003	94,943	2,347	3,584,175	301,787	286,510	21,509

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS
DURING THE CALENDAR YEAR 1915, SHOWN BY FISHING GROUNDS—Continued.

Fishing grounds.	Mackerel.									
	Large (over 21 pounds).				Medium (1½ to 21 pounds).				Small (under 1½ pounds).	
	Fresh.	Salted.	Fresh.	Salted.	Fresh.	Salted.	Fresh.	Salted.	Fresh.	Salted.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
LANDED AT BOSTON.										
<i>East of 66° west longitude.</i>										
Cape Shore.....	258,790	\$26,316	104,037	\$4,160	269,562	\$20,488	3,753	\$1,751	281,752	\$14,434
<i>West of 66° west longitude.</i>										
Georges Bank.....	125,247	14,750	15,000	1,260	225,990	22,514	1,400	181	166,346	8,408
Middle Bank.....	2,399	503	161	26	5,354	454	833	100	62,568	3,104
Jeffreys Ledge.....	1,439	304			1,000	100			5,112	433
Ipsewich Bay.....					1,545	170			8,420	618
South Channel.....	3,140	675			8,147	996			20,490	808
Nantucket Shoals.....	7,050	1,274			17,711	1,929			57,790	3,089
Off Cape Cod.....	26,531	2,994	6,000	420	37,811	2,703	36,000	2,460	197,973	10,009
Off Race Point.....	36,007	2,098			30,123	1,763			574,542	28,582
South.....	11,852	1,422	18,000	856	6,804	961	6,000	285	701	112
Shore, general.....	166,433	15,515	2,700	113	244,554	20,697	3,600	180	2,463,370	98,885
Total.....	638,888	63,851	145,898	6,835	851,391	72,715	85,566	4,987	3,839,104	168,782
LANDED AT GLOUCESTER.										
<i>East of 66° west longitude.</i>										
Cape Shore.....			624,700	23,958			23,600	2,210		
Gulf of St. Lawrence.....			22,800	1,980						
<i>West of 66° west longitude.</i>										
Georges Bank.....	5,100	391	221,700	15,596			21,300	1,505	532,921	25,103
Middle Bank.....									6,730	220
Nantucket Shoals.....					126,865	5,365	20,600	1,157	13,600	945
Off Race Point.....							2,000	140		
Shore, general.....	51,025	3,479			14,689	782			1,236,681	40,733
Total.....	56,125	3,870	869,200	41,574	119,131	6,797	67,700	5,012	1,809,932	67,001
Grand total.....	695,013	67,721	1,015,098	48,369	1,000,525	79,512	153,296	9,999	5,649,036	235,783
									2,140,421	81,646
									125,000	6,801
									962,021	68,161
									2,140,421	81,646
									2,405,134	172,695

Fishing grounds.	Miscellaneous.		Total.		Grand total.
	Fresh.	Salted.	Fresh.	Salted.	
	Pounds.	Value.	Pounds.	Value.	Pounds.
LANDED AT BOSTON.					
<i>East of 66° west longitude.</i>					
La Have Bank.....	6,796	\$464	944,359	\$27,598	944,359
Western Bank.....	82,882	8,991	2,881,105	61,005	2,881,105
Quebec Bank.....			23,338	977	23,338
Green Bank.....			30,000	3,500	30,000
Grand Bank.....	31		69,635	4,454	69,635
St. Peter's Bank.....	508		2,671	36,038	2,671
Off Newfoundland.....	a 600,000	15,900	655,000	20,300	655,000
Cape North.....			40,100	3,235	40,100
Cape Shore.....	871,924	67,023	4,916,815	\$6,826	5,083,858
Gulf of St. Lawrence.....			214,069	107,043	214,069
St. Ann's Bank.....			13,259		13,259
The Gully.....			35,737	874	35,737
Roseway Bank.....			26,785	995	26,785
			3,906		3,906
<i>West of 66° west longitude.</i>					
Browns Bank.....	188,492	8,070	14,662,469	394,142	14,663,104
Georges Bank.....	1,475,094	142,324	13,034,502	1,441	13,050,902
Cashes Bank.....	34,858	1,814	990,940	21,349	990,940
Clark Bank.....	9,399	235	318,837	6,932	318,837
Fippentes Bank.....	6,325	118	192,125	4,845	192,125
Tillies Bank.....	650	21	12,140	285	12,140
Middle Bank.....	80,375	1,797	2,869,571	92,251	2,870,775
Jeffreys Ledge.....	222,079	5,632	6,333,171	201,945	6,353,171
Ipswich Bay.....	1,698	37	289,644	9,531	289,644
South Channel.....	1,028,835	34,432	24,298,901	587,760	24,298,901
Nantucket Shoals.....	50,361	1,708	1,070,608	33,021	1,070,608
Off Hingham Light.....	5,483	99	14,174,593	3,405	14,236,593
Off Chatham.....	465,647	9,310	375,355	62,000	378,895
Off Race Point.....	11,949	228	632,621	78,100	730,721
Bay of Fundy.....	9,300	291	299,360	1,959	299,360
Seal Island.....	750	16	46,269		46,269
South.....	28,433	1,101	47,900		71,900
Shore, general.....	627,066	13,834	8,161,552	1,141	8,314,342
Total.....	5,809,344	314,113	97,397,285	2,888,354	97,899,487
					2,911,314

a Herring.

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS
DURING THE CALENDAR YEAR 1915, SHOWN BY FISHING GROUNDS—Continued.

Fishing grounds.	Miscellaneous.				Total.		Grand total.
	Fresh.		Salted.		Fresh.	Salted.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
LANDED AT GLOUCESTER.							
<i>East of 69° west longitude.</i>							
La Have Bank.....					\$32,791	\$3,980	Value.
Western Bank.....					2,131,261	145,970	2,277,231
Green Bank.....					5,047,891	322,309	5,370,200
Grand Bank.....	138	\$12			85,717	9,935	95,652
St. Peter's Bank.....					1,526,694	56,707	3,334,256
Sambro Bank.....					144,450	7,034	169,339
Burgoe Bank.....					1,071,348	60,307	2,615,067
Burgoe Bank.....					7,015	568	112,625
Burgoe Bank.....					268,020	3,327	28,135
Burgoe Bank.....					130,372	6,184	268,710
Burgoe Bank.....					37,650	21,287	151,859
Off Newfoundland.....					1,801,933	2,036	113,880
Cape North.....	1,770,150	\$1,075	8,931,550	\$186,819	10,701,640	238,674	295,408
Cape Shore.....					164	2,174	72,710
Gulf of St. Lawrence.....	9,936	636			78,210	2,338	2,338
St. Amos Bank.....					2,069,314	56,573	2,069,314
The Gully.....					8,146,424	229,670	8,146,424
Labrador Coast.....					1,708	619,780	10,800
					82,665	3,128	31,215
					120,126	9,290	9,290
<i>West of 69° west longitude.</i>							
Browns Bank.....					67,425	2,829	4,529,778
Georges Bank.....					108,040	87,145	10,227,461
Cashes Bank.....					473,353	5,766	195,185
Fippin's Bank.....					20,455	253	478,353
Middle Bank.....	5,250	\$1			30,549	20,955	20,955
Jetties Ledge.....					1,002,700	83,011	1,667,736
Ipswich Bay.....					2,613	191,600	2,613
South Channel.....	16,100	64			2,420	141,890	2,420
Nantucket Shoals.....					8,338	796,700	8,338
Oil Race Point.....					2,980	190,545	301,696
Bay of Fundy.....					945	15,600	12,842
Shore, general.....	2,847,995	30,824			53,180	140	1,085
					320,524	69,093	389,617
Total.....	4,649,509	\$4,752	8,931,550	\$186,819	49,677,980	1,012,279	1,826,603
Grand total.....	10,458,913	398,865	8,931,550	186,819	24,018,261	814,324	4,737,917

^a Herring, 1,708,150 pounds, value \$3,045; and caplin, dried, 2,000 pounds, value \$30.
 316,224 pounds, value \$7,376; catfish or wolffish, 179,999 pounds, value \$9,197; flounders, 652,172 pounds, value \$29,884; herring, 1,977,620 pounds, value \$20,381; horse mackerel, 671 pounds, value \$27; redfish, 88,694 pounds, value \$1,134; shad, 421,701 pounds, value \$8,602; sharks, 24,418 pounds, value \$246; skates, 114,876 pounds, value \$1,439; swordfish, 2,258,967 pounds, value \$221,559; tilefish, 28,518 pounds, value \$1,102; whiting, or silver hake, 4,800 pounds, value \$48; porpoise, 200 pounds, value \$18; lobster, 6,000 pounds, value \$1,080; turtle, 75 pounds, value \$5; flivers, 1,153,450 pounds, value \$16,088; sounds, 100,655 pounds, value \$5,947; spawn, 70,213 pounds, value \$6,029; and tongues, 1,500 pounds, value \$75.

Month.	Pollock.				Cusk.				Halibut.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
LANDED AT BOSTON.												
January.....	222,414	\$5,505	4,065	\$61	213,707	\$3,902	490	\$12	19,083	\$4,967	230	\$23
February.....	145	2,499	2,489	3	38,827	752	450	10	123,820	9,159	20	2
March.....	211,213	5,586	3,595	38	103,650	1,531	2,760	69	407,347	34,205	455	46
April.....	153,714	3,744	25,600	63	434,335	6,893	4,962	124	440,169	29,018	65	7
May.....	523,943	8,597	56,392	458	150,275	2,255	130	3	136,528	11,272	3,818	382
June.....	694,362	18,797	64,040	1,094	278,117	4,000	12,100	302	451,662	24,942	98,621	6,232
July.....	681,627	18,398	36,800	643	400,537	5,649	13,113	327	255,951	19,596	18,685	1,121
August.....	553,840	13,468	16,346	292	688,757	9,644	14,575	365	274,850	20,464	5,200	313
September.....	599,300	14,266	15,462	272	318,513	4,413	18,935	452	221,931	14,767	56,926	4,680
October.....	188,206	3,406	9,616	11	27,674	378	10,775	270	143,672	13,617	102,151	8,673
November.....	157,900	2,271	9,035	148	11,725	165	617	15	90,880	10,245	339	30
December.....									27,410	3,148		
Total.....	4,284,447	103,733			3,321,681	53,127			930,409	102,327		
LANDED AT GLOUCESTER.												
January.....	294,600	8,824	4,065	\$61	51,325	907	490	\$12	79,546	9,027	230	\$23
February.....	74,488	3,199	2,489	3	38,827	752	450	10	123,820	9,159	20	2
March.....	284,541	7,032	3,595	38	103,650	1,531	2,760	69	407,347	34,205	455	46
April.....	373,147	7,782	25,600	63	434,335	6,893	4,962	124	440,169	29,018	65	7
May.....	583,211	5,607	56,392	458	150,275	2,255	130	3	136,528	11,272	3,818	382
June.....	129,498	1,276	64,040	1,094	278,117	4,000	12,100	302	451,662	24,942	98,621	6,232
July.....	31,610	310	36,800	643	400,537	5,649	13,113	327	255,951	19,596	18,685	1,121
August.....	68,385	616	16,346	292	688,757	9,644	14,575	365	274,850	20,464	5,200	313
September.....	73,025	730	15,462	272	318,513	4,413	18,935	452	221,931	14,767	56,926	4,680
October.....	440,235	5,009	9,616	11	27,674	378	10,775	270	143,672	13,617	102,151	8,673
November.....	4,010,630	64,847							90,880	10,245	339	30
December.....	2,304,496	39,623							27,410	3,148		
Total.....	8,676,866	145,455	234,640	4,070	2,914,120	42,876	94,943	2,347	2,653,766	199,460	286,510	21,509
Grand total.....	12,961,313	249,188			6,235,801	96,003	94,943	2,347	3,584,175	301,787	286,510	21,509
Grounds E. of 66° W. long.....	198,076	2,963	54,635	957	1,670,590	23,902	53,797	1,335	2,884,095	217,505	286,205	21,488
Grounds W. of 66° W. long.....	12,793,237	246,225	180,005	3,113	4,565,211	72,101	41,146	1,012	700,080	84,282	305	21
Landed at Boston in 1914.....	4,635,089	90,372			2,698,546	45,970			826,836	88,441		
Landed at Gloucester in 1914.....	7,588,457	103,150	211,177	4,214	3,078,507	53,577	111,937	3,232	2,236,164	157,886	316,555	30,073

REPORT OF THE COMMISSIONER OF FISHERIES.

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Month.	Miscellaneous. ^a				Total.		Grand total.
	Fresh.		Salted.		Fresh.	Salted.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.
LANDED AT BOSTON.							
January.....	529,461	\$15,486			6,579,265	\$187,655	6,579,265
February.....	329,574	12,117			7,903,937	248,173	7,903,937
March.....	172,210	5,992			8,728,754	244,423	8,728,754
April.....	61,120	2,125			6,191,033	125,113	6,191,033
May.....	174,353	2,838			5,941,035	141,404	5,941,035
June.....	544,399	31,046			9,717,558	299,305	9,904,905
July.....	1,200,904	85,702			8,871,604	326,394	8,968,604
August.....	824,559	61,267			10,101,783	296,072	10,104,583
September.....	901,024	54,703			10,225,493	290,945	10,228,293
October.....	634,153	30,321			11,295,190	313,336	11,501,750
November.....	239,604	6,905			6,067,274	228,892	6,067,274
December.....	197,953	6,501			5,775,359	186,656	5,775,359
Total.....	5,809,344	314,113			97,397,285	2,888,354	97,899,487
LANDED AT GLOUCESTER.							
January.....	1,770,150	53,075			3,144,161	98,044	5,804,861
February.....				\$38,379	2,076,759	73,931	2,194,882
March.....					5,621,395	116,149	6,231,347
April.....	120,000	1,837			4,175,569	69,409	4,630,127
May.....	543,400	6,332			5,016,361	89,231	5,604,678
June.....	1,361,730	13,464			4,670,109	84,114	3,604,678
July.....	545,210	4,500		613	6,846,825	116,972	1,620,787
August.....	244,620	2,050			6,406,353	107,797	2,076,027
September.....	10,638	117			3,499,283	81,911	2,418,598
October.....	18,246	844			4,703,700	94,645	861,678
November.....	7,600	587			2,784,380	55,570	6,381,197
December.....	27,975	1,946					
Total.....	4,649,569	84,752		186,819	49,677,980	1,012,279	24,018,261
Grand total.....	10,458,913	398,865		186,819	147,075,265	3,900,633	24,520,463
Grounds E. of 66° W. long.							
Grounds W. of 66° W. long.	3,342,694	146,229		186,819	28,710,215	816,087	19,659,246
Landed at Boston in 1914.....	7,116,219	252,636			118,365,050	4,861,217	208,214
Landed at Gloucester in 1914.....	4,646,219	231,003		2,100	92,231,172	2,609,877	113,020
Total.....	5,685,365	118,734		106,528	49,343,823	1,031,769	20,901,205

^a Includes herring from Newfoundland, 2,368,150 pounds frozen, \$68,945, and 8,430,800 pounds salted, \$186,783.

The fish landed at Boston and Gloucester, Mass., by American fishing vessels are taken principally from fishing grounds lying off the coast of the United States. In 1915, 71.78 per cent of the quantity and 70.74 per cent of the value of the catch landed by the American fishing fleet at these ports were obtained from these grounds. Of the remainder, 9.41 per cent of the quantity and 9.70 per cent of the value were taken from fishing banks off the coast of Newfoundland, 18.73 per cent of the quantity and 19.35 per cent of the value from grounds off the Canadian Provinces, and less than 1 per cent of both the quantity and value from the coast of Labrador. Newfoundland herring constituted 6.58 per cent of the quantity and 5.39 per cent of the value of the products landed at these ports during the year. The herring were taken on the treaty coasts of Newfoundland, but cod and other species from that region were obtained chiefly from fishing banks on the high seas. All the fish caught by American fishing vessels off the Canadian Provinces were from offshore fishing grounds. The catch from each of these fishing regions is given in detail in the following table:

QUANTITY AND VALUE OF FISH LANDED BY AMERICAN FISHING VESSELS AT BOSTON AND GLOUCESTER, MASS., IN 1915, FROM GROUNDS OFF THE COAST OF THE UNITED STATES, NEWFOUNDLAND, AND CANADIAN PROVINCES.

Species.	United States.		Newfoundland. ^a		Canadian Provinces.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Cod:								
Fresh.....	23,695,413	\$689,361	484,815	\$9,962	9,907,896	\$189,529	34,088,124	\$888,852
Salted.....	1,876,888	71,419	3,009,390	105,146	6,081,495	207,543	10,967,773	384,108
Haddock:								
Fresh.....	51,712,661	1,185,386	100	1	6,100,289	120,065	57,813,050	1,305,452
Salted.....	69,675	1,235	14,075	246	46,844	880	130,594	2,361
Hake:								
Fresh.....	11,248,569	232,237	54,860	704	3,285,886	44,529	14,589,315	277,470
Salted.....	24,713	428	91,200	1,450	184,712	3,129	300,625	5,007
Pollock:								
Fresh.....	12,762,282	246,213	665	12	198,366	2,963	12,961,313	249,188
Salted.....	180,005	3,113	7,865	138	46,770	819	234,640	4,070
Cusk:								
Fresh.....	4,550,491	71,946	3,345	52	1,681,965	24,005	6,235,801	96,003
Salted.....	41,146	1,012	5,387	133	48,410	1,202	94,943	2,347
Halibut:								
Fresh.....	699,496	84,225	1,149,408	84,014	1,735,271	133,548	3,584,175	301,787
Salted.....	305	21	145,665	11,304	140,540	10,184	286,510	21,509
Mackerel:								
Fresh.....	6,534,400	321,778			810,174	61,238	7,344,574	383,016
Salted.....	2,668,485	190,986			905,343	40,077	3,573,828	231,063
Herring:								
Fresh.....	1,977,620	20,381	2,368,150	68,945			4,345,770	89,326
Salted.....			8,930,800	186,783			8,930,800	186,783
Swordfish:								
Fresh.....	1,307,317	145,155	868	68	930,782	76,336	2,238,967	221,559
Miscellaneous:								
Fresh.....	3,830,532	87,084	2,000	30	41,644	866	3,874,176	87,980
Salted.....			750	36			750	36
Total.....	123,179,998	3,351,980	16,269,343	469,024	32,146,387	916,913	171,595,728	4,737,917

^a Includes 17,975 pounds of salted cod, valued at \$617, and 102,151 pounds of salted halibut, valued at \$8,673, from the Labrador coast.

Cod.—In 1915 there were 33 vessels employed in the salt-bank fishery and 102 in the market fishery landing their fares at Boston and Gloucester. Considerable cod was landed also by vessels operating on shore grounds. There were landed at these ports 45,055,897 pounds of fresh and salted cod, 34,088,124 pounds of the former and 10,967,773 pounds of the latter, valued at \$1,272,960, against 47,529,625 pounds in 1914, of which 36,079,873 pounds were fresh and

11,449,752 pounds salted, valued at \$1,359,416. There was, therefore, a decrease in the quantity in 1915, as compared with the previous year, of 1,991,749 pounds in the fresh and 481,979 pounds in the salted cod landed.

Several large fares of cod were caught during the season of 1915. A trip amounting to 359,483 pounds taken on trawl lines was landed at Gloucester in July, and one of the dory hand-line fleet brought in 478,365 pounds in September, this being the largest fare taken since 1909, when the same vessel weighed off 479,433 pounds.

Haddock.—The haddock fishery in 1915 was carried on with about the same success as in the previous year. The quantity of haddock landed was 57,943,644 pounds, valued at \$1,307,813, an increase over the previous year of 189,516 pounds in quantity and a decrease of \$73,343 in value. The catch of haddock by line trawlers landed at Boston amounted to 30,776,733 pounds, of which 16.57 per cent were "scrod." The greater part of the scrod haddock brought in by line trawlers came from the inshore grounds, the offshore banks supplying a greater proportion of large haddock. On the inshore grounds the amount of scrod haddock taken varied from 18 to 22 per cent of the total catch and on the offshore grounds from 2 to 8 per cent.

Pollock.—The pollock fishery, which in recent years has supported a considerable fleet of small craft employing purse seines as a means of capture, was carried on with greater success than in 1914. The total catch of pollock landed at Boston and Gloucester, including those taken on hand and trawl lines and in gill nets, was 13,195,953 pounds, having a value of \$253,258, an increase of 741,230 pounds in quantity and \$53,522 in value compared with 1914. As in previous years, most of the pollock landed by purse seiners and gill netters were caught in spring and fall months.

Halibut.—In the last few years the halibut fishery on the Atlantic coast has fluctuated but little. The yield of fresh and salted halibut in 1915 was 3,870,685 pounds, 3,584,175 pounds of the former and 286,510 pounds of the latter, valued at \$323,296, an increase of 491,100 pounds and \$46,946 over 1914. The largest catches of this species were made on Georges, Browns, La Have, Quereau, Western, and Grand Banks, the last-mentioned bank supplying the greatest amount. The fishery was conducted throughout the year, but the bulk of the catch was taken during the early spring and summer months. The vessels regularly employed in this fishery numbered 33 sail, although many of the cod hand-line and trawl-line fishermen frequently caught halibut in considerable quantities. The usual activity was displayed in this fishery in the spring of 1916. At the end of May the fleet engaged numbered 26 vessels, and a considerable number of fairly large fares were landed.

The otter-trawl fishery.—This method of fishing, as in 1914, was carried on by 12 steamers. With the exception of several trips landed at Portland and an occasional trip disposed of at Gloucester during such times when there was a glut of fresh haddock in the market, the bulk of fish caught by otter trawlers was landed at Boston. The year's catch was 21,116,300 pounds, representing 380 trips, an increase of 8 trips. There were landed from Georges 105 trips, from South Channel 248, Western Bank 26, and Browns Bank 1. As in the previous year, Western Bank was resorted to in March, April, and May, when haddock were less plentiful on Georges and

in the South Channel than during the winter months. Of the total quantity of fish landed at Boston by this class of vessels, 17,062,732 pounds were haddock, of which 39.28 per cent were "scrod." The great disparity in the landings of small fish by this method as compared with line trawls is confined wholly to haddock, the large and small fish of other species caught by the two methods, such as cod, cusk, and hake, being more equally divided.

On July 20, 1915, the otter trawler *East Hampton* landed at Gloucester 310,000 pounds of fresh fish, most of which were haddock. The largest trip previously brought in was 300,000 pounds, caught by the otter trawler *Long Island*. These were the largest fares ever taken by American otter trawlers.

Mackerel.—The amount of salted mackerel taken in 1915 was 19,691 barrels, exceeding the catch of the previous year by 4,170 barrels. The catch off the New England coast was 15,480 barrels and on the Cape Shore, including a few fares from the Gulf of St. Lawrence, 4,211 barrels, or 750 barrels less than was taken in those regions in 1914. The total catch of fresh mackerel by the fleet was 71,564 barrels, compared with 68,582 barrels the previous season. The number of fresh mackerel taken on the Cape Shore was 781,000, which exceeded the catch of 1914 by over 200,000 fish. In the fall of 1915 several vessels of the seining fleet made phenomenal catches in Massachusetts Bay, one vessel making a stock of \$6,548 in three weeks, at which time it was reported that a much larger body of mackerel was on the coast than had been observed for several years.

The mackerel fishery in the spring of 1916 showed a marked improvement over that of 1915, the catch up to May 15 being nearly double the amount recorded the previous season on the same date. Three vessels of the seining fleet stocked over \$9,000 each and one \$11,246, the last-mentioned stock being \$2,361 more than the highest made by a single vessel to the end of May, 1915. There were engaged in the southern mackerel fishery 24 seiners and 58 netters. Fifteen of the latter sailed from Gloucester and 43 from other ports. The number of seiners was one less than in 1915, but there was an increase of 41 netters. A portion of the seining fleet sailed on March 24, but none of the netters sailed until April 25. The first mackerel of the season of 1916, amounting to 7 barrels, were caught on April 5 about 80 miles east by south from Cape Henlopen, or practically in the same locality where the first fish were encountered the previous season. The fish were landed at Lewes, Del., from which place they were shipped to New York by rail. Other small trips were caught in the same region within a few days, but the first fare of any considerable size was landed at New York on April 26, one vessel bringing in 41,800 fish, followed the next day by the arrival of 6 vessels with trips ranging from 6,000 to 40,000 fish. From this time until the middle of May the supply of mackerel in the New York market was about equal to the demand. For the week ended May 3 the amount of fresh mackerel landed was 553,000 in number, mostly large and medium, compared with 268,576 fish last year, which were mostly small. Many of the large mackerel in April sold for 40 cents each. The average price ranged from 12 to 20 cents for large and medium, while tinkers brought from 3 to 6 cents a pound.

On May 31 there were 1,200 mackerel landed at Boston, the first fare of the season. Four vessels of the seining fleet sailed for the

Cape Shore May 25, and on June 6 the number had increased to 24 sail. The first mackerel of the season from this region were landed at Boston on June 9, the trip consisting of 10,000 large and 35,000 medium fresh mackerel and 170 barrels salted. On June 10 there were 3 other arrivals from the Cape Shore with fares taken off Halifax and Liverpool, the combined catch amounting to 125,000 of mixed fresh mackerel and 230 barrels salted. At that time there were 15 other seiners on the ground, all of which captured schools of mackerel. Mackerel were reported plentiful on the Cape Shore until June 21, and many large trips were taken. The highest stock made by a single vessel in this region was \$6,343, which is the largest recorded for one trip in recent years. Fish were also abundant during the month on grounds in the vicinity of No Mans Land, the entire fleet of seiners and netters fishing in that locality doing well.

Swordfish.—This species was more plentiful in 1915 than in the previous year, and 2,238,967 pounds, having a value of \$221,559, were landed at Boston and Gloucester, an increase of 739,123 pounds and \$43,860 over 1914. There were 42 vessels engaged in the fishery, operating mostly on the more eastern grounds, although some good catches were made on Georges, Nantucket Shoals, and adjacent grounds. On July 20, 17 vessels landed at the Boston Fish Pier 1,126 swordfish that had been taken on Georges. This was probably the greatest number of swordfish ever landed at an American port in one day.

Winter gill-net fishery.—The winter gill-net fishery practically ceased at the end of May. A fleet of 30 vessels was employed at Gloucester during the season, and there were a few vessels that operated out of other ports. Fishing was conducted on the inshore grounds along the New England coast from Cape Ann to Portland. As in previous years, the principal species taken by this method were cod, haddock, and pollock. While the fleet as a whole did not meet with the same degree of success as in some years past, the fishery was an improvement over the previous season. Several good stocks were made, one vessel making \$30,000, with a share of \$1,500 to each member of the crew. This was probably the highest record ever attained in one season by a vessel engaged in the winter gill-net fishery.

Italian fishing boats.—The number of Italian motor boats fishing out of Boston and landing their catch at that port has increased in the last few years. At the present time there are approximately 200 boats of this class engaged in the shore fisheries, all of which are too small for registration, being under 5 tons, and in consequence their catch is not recorded in the Boston and Gloucester bulletins. These boats take a variety of species and operate several kinds of fishing gear, namely, trawl lines, hand lines, and drag seines.

Some ten years ago the catch of this class of boats consisted largely of flounders, but in the last few years greater efforts have been made to capture other species of ground fish, such as cod, haddock, cusk, hake, etc. Mackerel also have been taken to some extent. In 1915 the Italian catch landed at Boston, and sold through the New England Fish Exchange, was over 3,500,000 pounds of fish, valued at \$135,000. The catch consisted largely of cod, haddock, pollock, hake, and cusk. The amount of flounders landed was about 36,000 pounds.

PACIFIC HALIBUT AND COD FISHERIES.

The halibut banks off Oregon and Washington, recently surveyed by the steamer *Albatross*, were resorted to during the month of June, 1915, by a portion of the halibut fleet sailing out of Seattle, from which grounds 26 trips of halibut were taken in that month, comprising 1,318,000 pounds, valued at \$64,623. As halibut were scarce on these grounds in the summer months, the remainder of the catch of that species landed at Seattle from June to December was taken from banks farther north, extending from Flattery Bank, off the coast of Washington, to Portlock Bank, Alaska. This amounted to 13,876,970 pounds, having a market value of \$820,585. In the first half of the calendar year 1916, 25 fares were brought from the banks off Oregon and Washington, amounting to 931,692 pounds, valued at \$77,819. The total quantity of halibut landed at Seattle during that period, including the catch from banks farther north, was 7,391,384 pounds, valued at \$608,947, taken in 274 trips.

According to the Pacific Fisherman, the total catch of halibut on the Pacific coast by American vessels in 1915 was 50,238,390 pounds, of which 33,133,313 pounds were landed at Seattle, 11,323,500 pounds in Canadian ports, and 5,781,577 pounds in Alaska, against 48,902,575 pounds the preceding year, a gain of 1,335,815 pounds. The American fleet engaged in this fishery consisted of 100 sail, known as "independent" and "company" vessels, there being 89 of the former and 11 of the latter, ranging in size from 7 to 196 tons. The Canadian fleet comprised 27 vessels, the catch of which amounted to 16,031,265 pounds, an increase of 1,074,465 pounds over 1914.

The fleet employed in the cod fishery of the Pacific coast numbered 20 sail, including 2 vessels engaged in transporting cured fish from the shore stations in Alaska. Three regions were represented in the fishery—San Francisco by 9 vessels, Puget Sound by 8 vessels, and Alaska by 3 vessels. One of the Alaskan vessels was lost in the early part of the season. The fleet met with very good success and made a catch of 3,798,071 fish, equivalent to 19,092,319 pounds, the fish being reckoned at $4\frac{1}{2}$ pounds each. The catch fell short of that of 1914 by 122,831 fish, or 552,739 pounds.

The work of collecting statistics of the quantity and value of fishery products landed at Seattle, Wash., by American fishing vessels was reestablished in June, 1915, by the appointment of a local agent at that port. The products landed from July, 1915, to June, 1916, comprised 513 trips, including 19,580,163 pounds of halibut, valued at \$1,330,609, and 948,024 pounds of other species, valued at \$23,285; a total of 20,528,187 pounds, valued at \$1,353,894. The monthly receipts by species are shown in the following table:

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT SEATTLE, WASH., BY AMERICAN FISHING VESSELS DURING THE FISCAL YEAR 1916.

Month.	Number of trips.	Halibut.		Cod.		Black cod.	
1915.		<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>
July.....	61	2,700,430	\$152,859	.....	.....	39,300	\$855
August.....	36	1,698,288	92,253	645	\$10	8,860	217
September.....	53	2,172,000	132,496	1,312	20	332,000	8,300
October.....	31	1,644,792	103,952	.....	.....	130,545	3,164
November.....	30	2,312,527	147,994	.....	.....	17,000	425
December.....	28	1,660,742	92,108	.....	.....	26,000	650
1916.							
January.....	8	923,055	68,049	.....	.....	18,000	360
February.....	7	706,931	47,669	.....	.....	16,232	443
March.....	31	815,209	82,226	60	1	16,175	484
April.....	61	1,207,372	130,438	.....	.....	10,566	318
May.....	89	2,024,105	129,672	.....	.....	84,955	2,124
June.....	78	1,714,712	150,893	.....	.....	200,233	4,883
Total.....	513	19,580,163	1,330,609	2,017	31	\$99,866	22,223

Month.	Ling cod.		Rock cod.		Total.	
1915.	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>	<i>Pounds.</i>	<i>Value.</i>
July.....	.....	.....	.....	.....	2,739,730	\$153,714
August.....	.....	.....	1,000	\$15	1,708,793	92,495
September.....	.....	.....	.....	.....	2,505,312	140,816
October.....	.....	.....	10,000	250	1,785,337	107,366
November.....	.....	.....	.....	.....	2,329,527	148,419
December.....	.....	.....	.....	.....	1,686,742	92,758
1916.						
January.....	.....	.....	.....	.....	941,055	68,409
February.....	.....	.....	.....	.....	723,163	48,112
March.....	.....	.....	.....	.....	831,444	82,711
April.....	6,006	\$120	11,413	293	1,235,357	131,169
May.....	.....	.....	.....	.....	2,109,060	131,796
June.....	11,732	230	5,990	123	1,932,667	156,129
Total.....	17,738	350	28,403	681	20,528,187	1,353,894

^a Includes 5,000 pounds of salt halibut, worth \$125, landed in August. The remainder of the catch was sold fresh.

PROMOTION OF AMERICAN CAVIAR.

One of the most valuable of all fishery products is caviar, which is prepared from the roe of sturgeon primarily, but also from that of the paddlefish of the Mississippi Valley, and sometimes, under appropriate descriptive names, from the eggs of carp, whitefish, and other species. The product has always been imported extensively, while it is known that suitable material in this country is often wasted through ignorance of the fishermen as to the methods of preservation to employ. After a suitable investigation of the matter, the Bureau issued an economic circular describing in simple language the methods which may be efficiently employed by any fisherman. The paper had the twofold object of preventing unnecessary waste through ignorance or neglect and of awakening a more effective interest in the protection of the sturgeon and the paddlefish.

INTRODUCTION OF NEW AQUATIC FOODS.

One of the most useful ways in which the Bureau of Fisheries can serve the fishermen and the general fish-eating public is to make known new sources of aquatic foods and to assist in establishing fisheries and markets therefor. The conspicuous success achieved in the case of the sea mussel has been referred to in previous reports. This excellent, abundant, accessible, cheap, and widely distributed shell-fish, formerly neglected, has now become a staple in certain important markets. Various other water products of great prospective value, but now largely unutilized, should be exploited as speedily as possible, but the limited funds and facilities at the disposal of the Bureau for such work make it impossible to conduct an active campaign with more than one or two such articles at one time. In the fiscal year 1916 one hitherto neglected fish has been given a permanent and important place in the fisheries and fish trade by the Bureau's efforts, and a campaign of great prospective consequence has been inaugurated with reference to several others.

In October, 1915, the Bureau undertook to popularize the tilefish in the belief that it is a fish of great prospective food value. Its utilization had been advocated years ago, but the efforts to introduce it were not sufficiently comprehensive or sustained to bring success, and the fish in reality came into some disrepute because of the failures that attended the attempts to give it a commercial status. The task confronting the Bureau was to induce fishermen to catch the fish, dealers to handle the fish, and the public to consume the fish, and to bring all this about simultaneously. The effective methods pursued made it possible for the Government to withdraw from the campaign within one month and to intrust future developments to private enterprise.

The essential feature of the exploit was the chartering of a regular fishing vessel with practical fishermen as its crew. The auxiliary schooner *Stranger*, of Gloucester, carrying 12 men, was the vessel selected for the purpose. The Bureau had guaranteed the *Stranger* \$1,500 for one month's service, but in 27 days she caught 38,383 pounds of tilefish, which, after deducting commissions, sold for \$2,036.63; and not only was the Bureau at no expense whatever for the fishing operations, but the proceeds, taking no account of several thousand pounds gratuitously distributed for advertising purposes, yielded a substantial bonus to the crew over their regular remuneration.

When the wholesale trade of New York was requested to cooperate in the proposed campaign, the unfortunate past stood in the way of immediate acquiescence. "There is no demand for the fish," said the dealers, but the Bureau explained that getting the fish and creating a demand were its part of the work and that all that was desired of the trade was a cheerful willingness to handle the fish to satisfy such demand as might develop. When the first fare was landed in New York on October 22, four or five dealers in Fulton Market rather reluctantly agreed to handle the fish, some of which were given away and the remainder sold for 5 cents per pound. When the fourth trip arrived but 20 days later, 15 dealers were competing for the fish, which sold for 7 cents. In the interval a demand had arisen which no large wholesale or commission house could afford to ignore. This demand was created solely by an advertising campaign which kept the fish constantly be-

fore the public and concentrated attention on its points of interest and excellence. Newspapers were furnished items recounting the unusual history of the fish—its discovery, practical extermination, and reappearance; incidents in the campaign were exploited; fish were more or less conspicuously supplied to prominent persons; leading hotels and restaurants were induced to give the tilefish prominence on their menus; a great motion-picture company placed a camera man on the *Stranger* and exhibited motion pictures of the fishery as a feature of its weekly news reel; and the Bureau's own advertising matter was distributed freely.

The propaganda conducted in behalf of this fishery covered practically the entire field. The fishing grounds were found and pointed out to fishermen; a regular commercial fishing vessel was engaged to demonstrate the financial yield of this fishery under regular industrial conditions; the wholesale trade was enlisted in the distribution of the fish; the retailer was furnished with attractive display advertising matter calling his customers' attention to the fact that the fish was on sale; and the consumer was told about the tilefish and how to cook it, and his curiosity and interest were stimulated to the point where he wished to try it and asked his dealer for it. As a consequence, when the Bureau ceased its fishing operations, other vessels were already at work, and within 10 days of the landing of the last fare by the *Stranger* eight schooners were either in the fishery or about to enter it and by the end of the month had landed in New York about 156,000 pounds of tilefish.

The progress of this fishery has far exceeded expectations. While New York continues to be the center of the industry, Boston, Atlantic City, Newport, and other places have become practically interested by putting vessels in the fishery. At the end of June, 1916, the New York fleet consisted of 13 vessels making regular trips to the fishing grounds, although earlier in the season a number of other vessels were engaged. The catch has varied from month to month, but has shown a general upward trend as increased fares were brought in to meet the growing demand, and the yield in June exceeded that of any preceding month, aggregating over 1,221,000 pounds landed at New York in 28 fares. A new record was made in July, 1916, when 2,200,000 pounds were landed at New York, 230,000 at Boston, and various minor fares at other ports.

By the end of the fiscal year 1916, when the fishery was only eight months old, upward of 4,388,500 pounds of tilefish, which brought the fishermen over \$210,000, were caught and sold. The monthly receipts at New York were as follows:

Month.	Pounds.	Month.	Pounds.
November, 1915.....	156, 500	April, 1916.....	626, 000
December, 1915.....	170, 200	May, 1916.....	620, 000
January, 1916.....	398, 000	June, 1916.....	1, 221, 000
February, 1916.....	469, 000		
March, 1916.....	615, 000	Total.....	4, 275, 700

The tilefish grounds extend along the edge of the continental shelf from a point south of Nantucket to an area east of Atlantic City. Few fish have been taken in depths over 100 fathoms, and the best



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fish are in from 60 to 65 fathoms of water. as to the kind and quality of bait offered, menhaden, clams, etc., are very acceptable, they will bite freely on inferior kinds of bait, making the bait question comparatively easy to solve.

The fishery has proved a great deal more remunerative than was at first expected by most fishermen and is now considered by them as being well established. The prices received by the fishermen have at times been as high as 7 cents a pound and as low as $1\frac{1}{2}$ cents, the average being about 5 cents. The fish bears shipment perhaps better than any other staple fish of the Atlantic coast and now reaches consumers all over the eastern half of the country. Some large shipments have gone as far west as Kansas City. The catch in recent months has been at the rate of 20,000,000 pounds per annum.

Following long consideration and much discussion, the present Congress has passed an act, approved June 21, 1916, which provides a way of alleviating the losses sustained by the fishermen, more especially those of the Atlantic coast, from the ravages of dogfishes. The act carries an appropriation of \$25,000 to enable the Commissioner of Fisheries to conduct investigations and experiments to this end, and the method of procedure, as recommended by the Bureau and understood by Congress, is to make the dogfishes useful. Mistaken economic and biological conceptions as to the possibility of bringing about the extermination of dogfishes have been abandoned, and all persons now interested in the welfare of the fishermen and the advancement of the fisheries are united in the efforts that will be made, under authority of law, to convert an injurious and hitherto useless article into a valuable asset. While the dogfishes and other sharks yield by-products, such as oil, gelatin, and leather, of undoubted economic importance, their principal utility comes through their known value as food. The task before the Bureau is to overcome the deep-seated prejudice that exists against these fishes and to determine the ways and means for creating a demand for fresh and preserved dogfish that will react on the fishermen and enable them to market their catch at a profit.